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Volume XXII, Number 2 March, 1921

Edited by JAMES E. RUSSELL

CONTENTS

A Measure of Ability to Judge Poetry
Allan Abbott and M. R. Trabue

Demands of the Times upon Our Schools *W. H. Kilpatrick*

Horace Mann Studies in Elementary Education V
Marie Hennes

The Stalking of the Vitamines *W. H. Eddy*

College News and Departmental Notes

Alumni Activities

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VOL. XXII, NO. 2 MARCH, 1921

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TEACHERS COLLEGE RECORD

VOL. XXII MARCH, 1921 No. 2

A MEASURE OF ABILITY TO JUDGE POETRY

By ALLAN ABBOTT
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The place of the arts, including the art of poetry, in the curriculum has tended of recent years to be justified by educational theorists in terms of the training of critical appreciation. The study of these subjects, it has been asserted, should lead to increased ability to tell good from bad, and increased preference for the good, as a guide not merely to enjoyment of the classical, but to discrimination in the new. Instruction, however, (except when devoted to acquiring skill in the practice of an art) is mainly concerned with the acquirement of a body of information, including information regarding conventional critical opinion; and success in the study is measured by the ability to repeat the facts so learned.

If it were practicable to devise an objective test of independent critical judgment applied to specimens of the art previously unknown, light would be thrown on the degree of success attained in developing this power to appreciate; on the teacher's possession or lack of this power; possibly on the elements of the art itself that may profitably receive attention with pupils of a particular grade, and that may become criteria in selecting material for study in that grade. Conceivably something might be learned of the general psychological response to the stimuli of the art in question, and so, of the fundamental principles of the art itself considered as a social activity, designed to evoke popular response.

The beginnings of such a study in the field of poetry are here presented. From more than a hundred sets of poems, each in four versions, that were the subject of a preliminary study, two

graduated series, X and Y, of thirteen sets each, and of approximately equal difficulty, were submitted to some three thousand five hundred judges including persons of all grades from the fifth grade through each year of school, college, and university.

Before discussing the tests in detail, certain general postulates must be considered. First, as to the fundamental assumption that critical discernment can or should be a goal of teaching. Not all teachers so believe. A certain professor remarked, "You are after an impossible thing,—independent critical judgment is one of the rarest things in the world. People judge of a poem's merit as Bernard Shaw's critics judge plays,—a good poem is one known to have been written by a good author." This opinion was confirmed by a well known poet, who wrote, "It is absolutely quixotic to suppose that most people have any real appreciation of poetry at all . . . there is no necessity for liking poetry. If you do not like it, let it alone." Another professor wrote, "I have never believed that taste can be taught and have never tried to test it, but have only tried to give my students the biographical and historical settings." On the other hand, many teachers and literary men express their faith in the principle underlying the tests.

Second, as to the nature of poetry itself. Such a study as this must avoid taking a position on matters of controversy. It must not define poetry either in terms of imagination alone, or in terms of form; it must not give preference to romanticism on the one hand, or to classicism on the other; it must not favor rhyme or its absence, the strictest meter or the freest cadence. It must admit the intellectual, the emotional, the popular, the simple and naïve. Whatever, in short, has been widely accepted as poetry by the anthologists, critics, and poetry lovers of the world, for our purposes is poetry, from Mother Goose to Browning, from Spenser to Sandberg. All that we have a right to ask is that each specimen have the recognized excellences of its type, and that it be demonstrably superior to the versions with which it is to be compared. These being assured, the greater the range of types and periods represented, the better; for we are concerned with the ability to recognize the criteria not of a given school alone, be it the school of Pope, of Keats, or of Miss Lowell, but those of general poetic merit.

For this reason, a comparison of the work of one poet with that of another (even if on the same subject) would not constitute a fair test; certainly not an impersonal test. The case would be pre-judged in favor, let us say, of Milton over Pope, of Keats over Scott. A surer basis of judgment appeared to be a set of variants in which the original poem was deliberately made worse by diminishing or completely annulling one or another of its characteristic merits. Certain characteristics are so commonly thought to be important in poetry that their loss would spoil the poem for the eye of any intelligent critic not blinded by controversy; among these are the emotional tone, the imaginative quality of the thought, and the rhythmic form. In lowering the poetic quality, then, of each poem the attempt has been in one version (called hereafter "sentimental") to falsify the emotion by introducing silly, gushy, affected, or otherwise insincere feelings; in another version (the "prosaic") to reduce the poet's imagery to a more pedestrian and commonplace level; in a third (the "metrical") to render the movement either entirely awkward or less fine and subtle than the original.

An illustration of gross alteration of Miss Lowell's exquisite "To a Sea Shell" in these directions is furnished by Series X Set 3 (page 106) where version C is the sentimental, version A the prosaic, and version D the metrical. A less exaggerated spoiling of Mr. Masefield's "Sea Fever" is Series X, Set 12, in which the "metrical" version C substitutes very commonplace anapaests for the subtly beautiful movement of such lines as "And the wheel's kick, and the wind's song, And the white sail's shaking." The attempt was made to adhere to this system of mutilation in each set, spoiling the more complex poems at the upper end of each series only slightly, by reducing, rather than completely destroying, their quality; and making the changes in the simple child-poetry at the beginning of each series very gross indeed. In each perversion it was intended, also, to introduce no change, for better or worse, other than of the type indicated; but some slight secondary changes have probably crept in.

Statistically speaking it is of course possible that a poem might be improved by revision, even when the purpose was to weaken it. Nearly a hundred sets, so prepared, had to be rejected after preliminary experimentation because of too irregular results: the

original selection proved to be incapable of standing apart from its context, to be of really inferior merit, or the perversion of it introduced elements of interest or merit that attracted an undesired approval. No set has been retained for the final tests in which the original poem was not pronounced better than all its variants, by a group of experts including poets, literary editors, critics, and professors of literature.

The two series, X and Y, if printed here, would occupy an undue amount of space (twenty-six pages). The four specimens given (pp. 106–9) may be taken as typical; and the range of poetic types may be gathered from the complete list of titles below:

SERIES X

Set		
1	Milkman, Milkman	Mother Goose
2	The Attack (from Marmion)	Scott
3	To a Sea Shell	Amy Lowell
4	Potatoes	Lucas
5	Bugle Song	Tennyson
6	The Highwayman (final stanza)	Noyes
7	Fairy Gold	
8	Memory	Aldrich
9	Jenny Kissed Me	Hunt
10	In Praise of Pope	Dobson
11	Dirge (from Cymbeline)	Shakespeare
12	Sea Fever	Masefield
13	Temptation (lines from The Ring and The Book)	Browning

SERIES Y

Set		
1	As I was going—	Mother Goose
2	Going to the Tournament	Thornbury
3	Jump Rope Rhyme	(original)
4	Tea Time	Lucas
5	The Big Baboon	Belloc
6	House Fear	Frost
7	Sweet Peas (lines from "I stood tiptoe upon a little hill")	Keats
8	My Bonnie Mary	Burns
9	The Bobolink (lines from the Biglow Papers)	Lowell
10	The White Owl	Tennyson
11	Skating at Nightfall (lines from The Prelude)	Wordsworth
12	The Creation of Light (lines from Paradise Lost)	Milton
13	Fog	Sandberg

The selections in each series are arranged approximately in the order of their difficulty, as shown by the first three hundred judgments, although more extended experiment shows that certain elements should be transposed, and that Series Y is, for some grades at least, slightly easier than Series X. They are reprinted for general use, however, in the order used by us, to facilitate comparison of results here tabulated with those that may be obtained by other experimenters elsewhere.[1]

In order to make such comparison valid, the directions to examiners which were used in our experiments are reproduced below. Any variation from the procedure outlined will destroy the validity of the comparisons, particularly any suggestion of the different types of modification to which each poem has been subjected. Even the suggestion that one of the four versions is an original and that the others are modifications will create an attitude of mind which will invalidate comparisons with our findings.

DIRECTIONS FOR GIVING THE EXERCISES IN JUDGING POETRY

1. In distributing the papers, avoid all appearance of hurry or strain that might create the "examination atmosphere." The object of the present tests is to determine the appeal that various types of poetry make to persons of various ages; this purpose would be defeated if persons thought they were to be judged by the results.
   Read aloud the directions on the first page and point out the dotted line above each stanza on which the judges are to write "Best" or "Worst" to indicate their preferences.

2. Allow one period of forty minutes for each series (X and Y). Each person should make judgments on each set in each of the two series. Two periods will therefore be used in this work.

3. Do not explain or enlarge upon the printed directions. If asked what is meant by the phrase "like best as poetry," say "Judge it by whatever makes it seem better poetry to *you*." Do not suggest or particularize any qualities or elements of poetry.

[1] Any one desiring to make such comparison may purchase these tests in any desired quantity directly from the Bureau of Publications, Teachers College, 525 West 120th Street, New York City. Please do not fail to specify which Series, X or Y, is desired; otherwise both Series will be sent.

Read the poems, A, B, C, D, trying to think how they would sound if read aloud. Write "Best" on the dotted line above the one you like best as poetry. Write "Worst" above the one you like least.

SET 3. TO A SEA SHELL

A (.....)

Sea Shell, please sing me a song
Of ships and sailor-men;
Of strange kinds of birds and trees
On the Spanish Main:
Of fish and seaweed in the sea,
And whatever creature there may be,—
Sea Shell, please sing me a song!

B (.....)

Sea Shell, Sea Shell,
Sing me a song, Oh please!
A song of ships and sailor men,
Of parrots and tropical trees.
Of islands lost in the Spanish Main
Which no man ever may find again,
Of fishes and coral under the waves,
And sea-horses stabled in great green caves—
Sea Shell, Sea Shell
Sing me a song, O please!

C (.....)

Tender, tender Sea Shell,
Wilt thou sing me, please,
Of thy happy, happy home
'Neath the tropic trees?
Ah, the coral islands!
Ah, the wondrous fish!
For such a song I'd give thee, dear,
Whate'er a Shell could wish.

D (.....)

Sea Shell, I ask you will
You sing a song, please.
All about the ships and sailors
And the parrots in their tropical trees.
The islands I have read about on the Spanish Main
That no one will see again,
The fish and coral under the wave,
Sea Horses that have their stables in caves;
Sea Shell, I ask you will
You sing a song, please.

Read the poems, A, B, C, D, trying to think how they would sound if read aloud. Write "Best" on the dotted line above the one you like best as poetry. Write "Worst" above the one you like least.

Set 6. House Fear

A (.....)

Always—I tell you this they learned—
Always at night when they returned
To the lonely house from far away
To lamps unlighted and fire gone gray,
They learned to rattle the lock and key
To give whatever might chance to be
Warning and time to be off in flight:
And preferring the out- to the in-door night,
They learned to leave the house-door wide,
Until they had lit the lamp inside.

B (.....)

This is what they always learned
When to the house they returned
At night from so far away,
When lamps were out and fire gray.
To rattle the lock and key
So that whatever might be
Could be warned to take to flight.
Preferring out-door to in-door night
They'd leave the front hall door open wide
Till lamps were lighted inside.

C (.....)

This was the routine they learned
Always at night when they returned
To lamps unlighted and fires gone gray
When they had been away all day.
They learned to build the fire up quick
With half a split-up kindling stick.
And knowing how the cat delights
To sleep indoors by the fire of nights,
They learned to leave the house-door wide
For fear they might leave her shut outside.

D (.....)

Always their hearts would thrill with fear
When at dead of night they again drew near
To the dismal, lonely, dark abode
Where not a glimmer of lamp-light showed.
Trembling, they turned the lock and key
With pallid face and shaking knee.
There was nothing to cause their fright,
But they felt more safe in the out-door night!
So they left the house-door open wide,
And fell in a faint on the floor inside.

Read the poems, A, B, C, D, trying to think how they would sound if read aloud. Write "Best" on the dotted line above the one you like best as poetry. Write "Worst" above the one you like least.

Set 12. The Creation of Light

A (.....)

Let there be Light, said God, and forthwith Light
Ethereal, quintessence pure, first of things,
Came from the Ocean deep, and from the east
Began to travel through the gloomy air,
Hid in a glowing cloud; until the Sun
Should be created, in the cloud she had
To stay. God saw the Light, that it was good.

B (.....)

Let there be Light, said God, and forthwith Light
Ethereal, first of things, quintessence pure,
Sprung from the Deep, and from her native east
To journey through the airy gloom began,
Spher'd in a radiant cloud, for yet the Sun
Was not; she in a cloudy tabernacle
Sojourn'd the while. God saw the Light was good.

C (.....)

And God said "Let Light be," and there was Light.
The first ethereal created thing
To being sprang, and daily from the east
Began to travel through the darksome air;
Until the golden sun should be created
She sojourn'd in a radiant, shining cloud.
God look'd upon the Light and it was good.

D (.....)

Let there be Light, said God, and lo! the Light
Sprung from Tithonus' bed in darksome gloom,
Deck'd her fair form in garments rich and rare
And scattered smiles along the mournful sky.
Her chariot of the Sun not yet created,
Upon a cloud the nymph ethereal rode,
And when the cloud wept raindrops down, she flung
Comforting rainbows from her shining tent.

Read the poems, A, B, C, D, trying to think how they would sound if read aloud. Write "Best" on the dotted line above the one you like best as poetry. Write "Worst" above the one you like least.

SET 13. FOG

A (.....)

The fog comes
on little cat feet.

It sits looking
over harbor and city
on silent haunches
and then moves on.

B (.....)

The fog is as
quiet as a cat.

It comes creeping over
the city
and stays there quietly until the
first thing you
know it is gone.

C (.....)

The fog is like a maltese cat,
it is so gray and still,
and like a cat it creeps
about the city streets.

How gray it is! How cat-like!
Especially when it steals away,
Just like a cat.

D (.....)

Who sends the fog
so still and gray?
I fondly ask.

And Echo answers,
"E'en the same all-seeing Eye
that sends the still, gray cat."

At this point, the authors would like to acknowledge the generous coöperation of many teachers in schools and colleges in collecting the data on which the following tabulations are based. Our thanks also are due to colleagues in the Columbia University department of English and to a number of eminent literary men and women, nameless here because of a promise given, who subjected themselves to the tests, and whose votes were of the greatest value to us in the interpretation of results from the schools and colleges. They have not been tabulated, because in a relatively small group individual differences have an undue influence on any general conclusions, and with individuals highly sensitive to literary effects, these differences frequently include incomplete indication of choices; X but not Y, for example, or "Bests" but not "Worsts." Such discrepancies, however, are more than compensated by the illuminating comments, ranging from such cheering remarks as "Alas poor Swinburne" or "Would to God Robert Frost could see this" to rather extended correspondence on the nature of poetic taste, on the insensitiveness of critics as well as schoolboys to the Dirge from Cymbeline, and on the application of these or similar tests in clarifying students' ideas of poetic values. The suggestion of one poet, that all editors and critics take such a test, leads to the hope that a similar study, based on less familiar poems less grossly altered, may be made with the coöperation of poetry societies or other groups of literary people. For the present, however, our concern is with young people under academic instruction.

The judgment of each person on each of the twenty-six sets was carefully recorded, both as regards the version which was liked "Best" and as regards the version which was considered "Worst" in each set. These judgments were then tabulated for each group of judges, to show how many and what percentage of the entire group chose each of the versions as "Best" or as "Worst." These percentages for grades 5 to 8 of the elementary school, for the four years of high school, for the first and second year of college English, for upper class (Junior and Senior) elective literature classes, and for graduate students of English including many English teachers in advanced training courses, are given in Tables I to VIII on pages 115 to 118. Although the same type of summary was made for a large miscellaneous group, consisting of elementary school teachers, English teachers-in-training

and graduate students of educational administration, the results are not included in the printed tables, because the group was too heterogeneous.

In order to show more clearly the relative standing of each version with each group of judges, diagrams were made for each of the twenty-six sets, showing graphically the distribution of votes between the four versions. Fig. 1 is a reproduction of the diagram showing the votes on Miss Lowell's "To a Sea Shell" which with its three inferior versions is given on page 106. In all of these diagrams the continuous black line represents the percentages for the original version. It will be observed that the original is called "Best" by 32 per cent of the fifth grade, by 24 per cent of the sixth grade, by 35 per cent of the eighth grade, and so on until over 63 per cent of the E, or Graduate English group, call this version "Best."

The lower half of the diagram gives the same kind of facts for the judgments as to which version is "Worst." The general characteristics of each different version appear from the diagrams to be the same whether "Best" or "Worst" judgments are being considered. It is to be noted, however, that while versions A and D seem about equally bad so far as "Best" judgments are concerned, version D is called "Worst" far more frequently than version A.

Fig. 2 is the diagram for Mr. Sandberg's "Fog" and its perversions. Notice is invited to the similarity of the curve for the original as "Best" to the curve for the same version as "Worst." (In both diagrams, the original poem is most unpopular in the seventh and eighth grades of the elementary school and only becomes predominant when the graduate students of English are reached.) It should be stated here that most of this group of judges have had extensive experience as high school and college teachers of English, and that they have, on that account, a distinctly greater advantage over the college groups than would normally be obtained from one additional year of training.

Fig. 3 represents the diagrams showing the percentages of "Best" judgments for the two sets presented on pages 107 and 108. Anyone who wishes to study the "Worst" judgments for these two sets or to study the "Best" and "Worst" judgments for other sets, may very quickly plot the diagrams on coördinate paper.

FIGURE 1

SERIES X, SET 3, TO A SEA SHELL

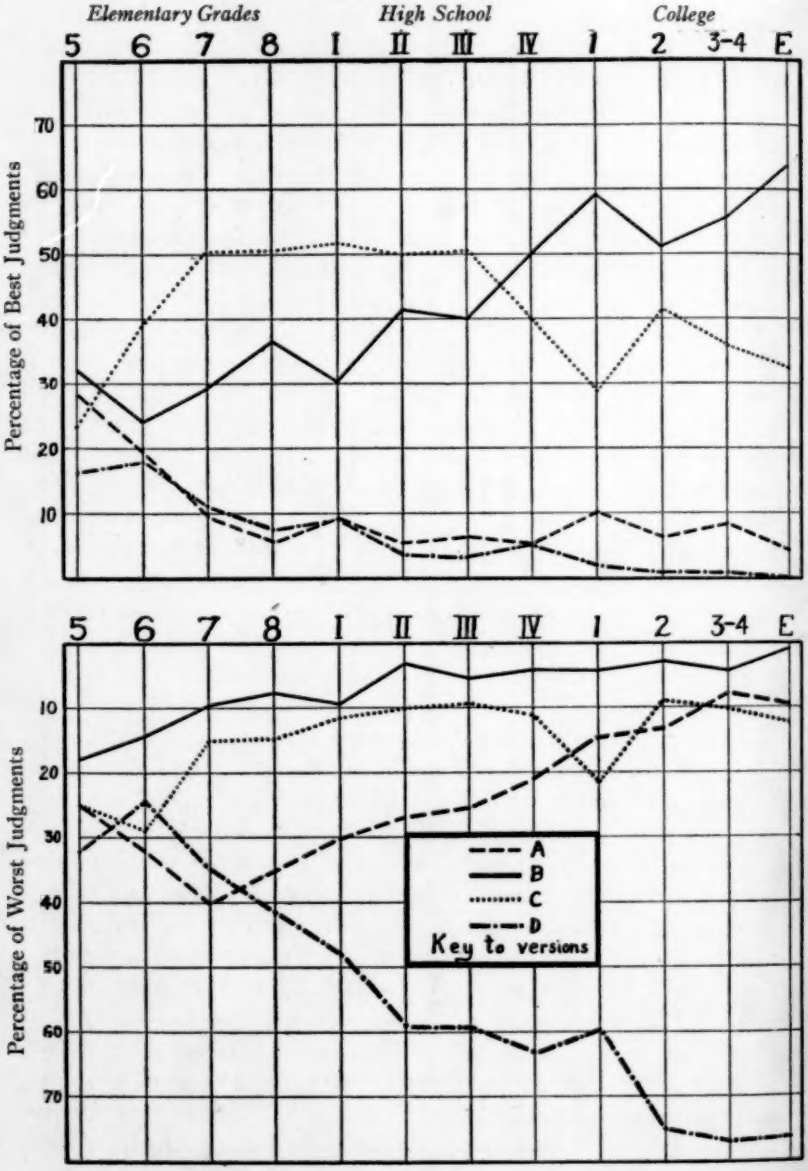

Elementary Grades
High School
College
5 6 7 8 I II III IV 1 2 3-4 E
Percentage of Best Judgments
70 60 50 40 30 20 10
5 6 7 8 I II III IV 1 2 3-4 E
Percentage of Worst Judgments
10 20 30 40 50 60 70
A
B
C
D
Key to versions

FIGURE 2

SERIES Y, SET 13, FOG

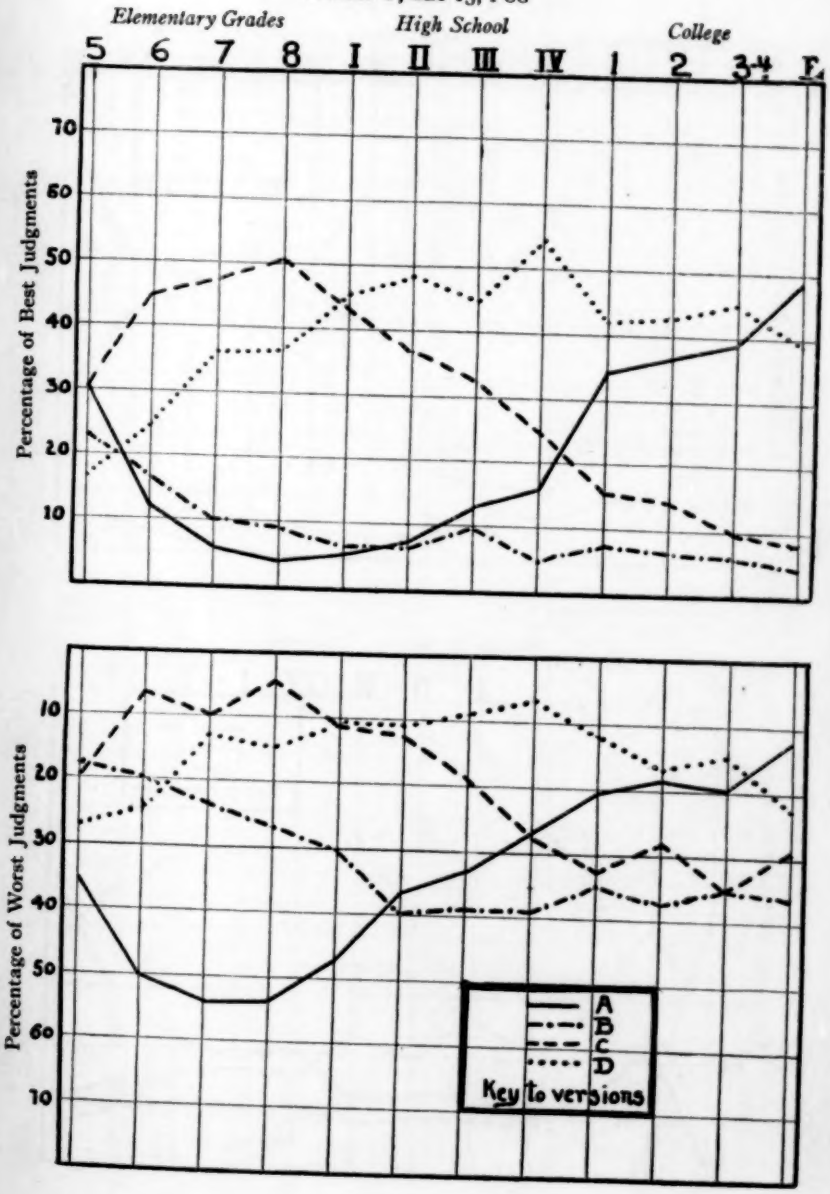
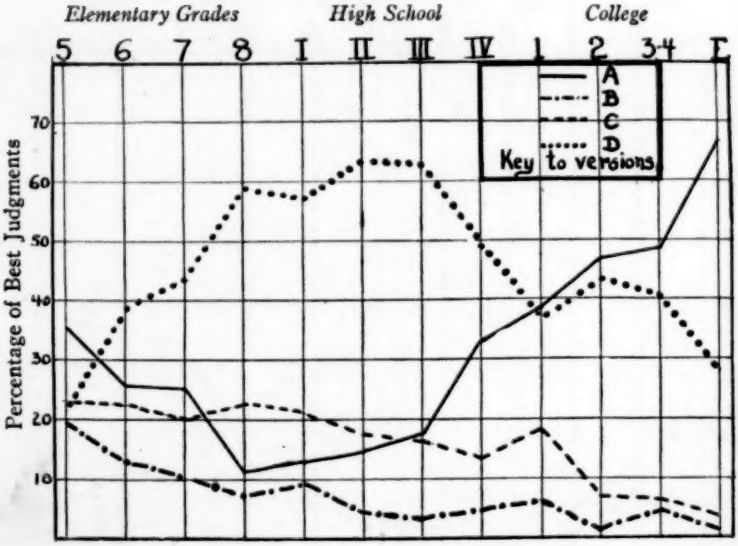


FIGURE 3

SERIES Y, SET 6, HOUSE FEAR



SERIES Y, SET 12, CREATION

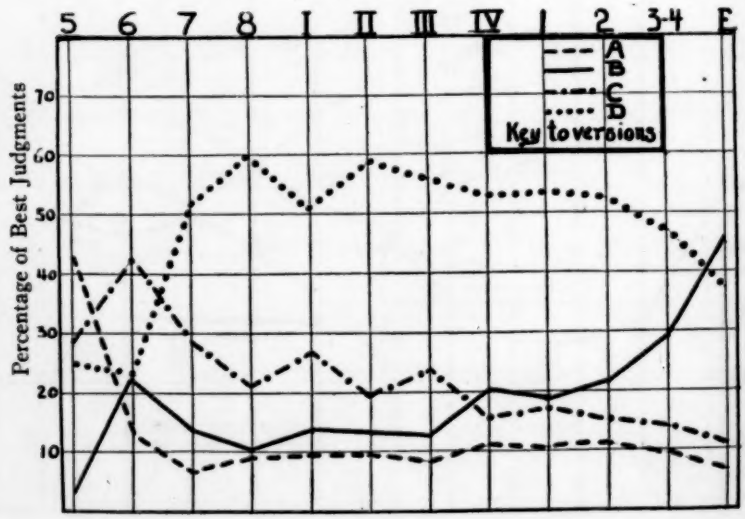


TABLE I—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION A AS "BEST"

SERIES X

Set No.	Elementary School				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	3.6	1.6	1.8	0	1.5	0	.7	.4	.4	1.1	.5	.4
2	28.6	32.3	15.1	10.7	6.9	5.5	4.2	3.5	1.3	1.7	2.0	.8
3	28.6	19.4	9.6	5.6	9.2	5.2	6.6	5.3	10.1	6.7	8.4	4.2
4	14.3	14.5	4.1	.6	4.6	2.1	1.7	.7	2.6	1.7	1.5	1.5
5	19.6	8.1	9.1	3.6	4.2	3.6	3.1	7.7	3.9	2.8	2.0	1.1
6	21.4	21.0	20.5	26.1	42.7	55.3	61.4	73.2	72.4	73.6	77.7	86.2
7	23.2	19.4	18.7	11.8	7.6	10.7	8.3	6.7	3.1	2.3	2.5	1.9
8	23.2	32.3	22.8	10.9	10.7	17.0	17.7	29.9	45.2	42.1	57.9	67.4
9	41.1	37.1	41.5	35.9	48.5	38.9	54.2	49.3	52.6	44.9	35.1	23.8
10	26.8	17.7	16.9	5.9	10.7	10.9	10.7	22.9	30.3	34.8	45.5	59.8
11	32.2	16.2	16.0	10.7	80	5.8	.5.2	14.4	15.8	21.4	20.3	37.6
12	28.6	17.7	18.7	9.8	80	6.7	.9.4	4.2	7.0	5.6	3.5	4.2
13	28.6	17.7	11.0	10.7	1712	16.1	16.7	19.0	31.1	25.3	36.1	47.1

SERIES Y

1	17.9	16.2	2.3	1.1	3.1	5.2	4.2	2.5	1.3	3.4	2 5	2 3
2	48 2	40 3	33 8	31 7	26 3	24 3	23 2	16 9	14 0	7 3	7.9	6.5
3	14.3	9.7	4.1	6.7	3.4	1.5	1.4	1.8	1.3	1.7	2.0	.8
4	25.0	38.7	32.0	35.7	48.8	51.7	55.9	58.1	75.4	78.1	81.7	85.8
5	48.2	51.6	53.4	37.3	41.6	37.4	38.2	30.6	28.1	35.3	17.3	13.8
6	35.7	25.8	25.1	11.2	12.2	14.9	17.7	32.7	38.2	47.2	48.5	66.7
7	17.9	24.2	14.2	6.2	8.4	9.7	11.4	9.5	11.4	14.1	7.9	5.7
8	30.4	29.0	24.7	25.8	23.3	28.6	34.8	35.2	30.7	30.9	29.7	24.1
9	41.1	27.4	37.0	37.9	39.7	38.3	37.1	35.2	28.1	25.8	13.4	13.8
10	23.2	30.6	36 5	33 4	40.4	32.5	34.4	29.6	31.6	28.1	22.8	18.0
11	16.1	22.5	25.6	23.0	31.3	31.6	33.7	37.7	48.7	46.6	52.0	63.2
12	42.9	12.9	6.4	8.7	9.5	9.4	8.0	11.3	10.5	11.2	9.9	6.5
13	30.4	14.5	6.4	4.2	5.3	7.9	13.2	16.2	34.6	36.5	38.6	48.3
No. of Judges	56	62	219	356	262	329	288	284	228	178	202	261

TABLE II—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION B AS "BEST"

SERIES X

Set No.	Elementary Schoo				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	16.1	6.4	5.9	2.8	4.2	1.8	1.7	3.9	3.9	3.4	5.0	1.1
2	16.1	27.4	24.2	17.4	15.3	15.5	13.5	10.9	14.5	8.4	5.4	3.4
3	32.2	24.2	29.2	36.5	30.1	41.3	39.9	50.0	59.2	51.1	55.4	63.6
4	8.9	19.4	19.6	20.5	26.7	33.1	38.5	40.8	49.6	48.9	58.9	62.8
5	34.0	22.6	20.1	15.1	9.9	9.4	9.4	6.3	5.7	5.1	1.5	1.9
6	16.1	11.3	13.7	9.0	8.0	6.1	2.1	3.2	4.8	1.1	3.0	4.6
7	14.3	17.7	18.3	22.7	30.5	29.5	34.7	49.6	63.2	66.2	74.3	74.7
8	39.3	33.9	32.9	33.1	34.7	33.4	34.0	16.9	18.9	15.2	10.9	9.2
9	26.8	22.6	23.7	28.1	19.8	20.3	14.9	13.7	4.4	6.2	5.0	5.4
10	21.4	16.2	32.4	21.0	22.5	21.3	25.0	15.5	11.0	9.6	6.4	7.3
11	16.1	14.5	8.7	6.5	11.1	7.3	5.2	4.2	2.6	3.9	3.5	3.8
12	19.6	19.4	12.8	4.2	4.6	5.8	3.8	9.5	16.7	20.2	26.7	42.1
13	21.4	29.1	29.7	36.8	35.1	43.2	39.6	45.4	36.8	44.4	36.1	25.7

SERIES Y

1	73.2	75.8	91.8	91.8	88.5	90.3	93.4	92.6	93.0	90.5	93.1	97.3
2	30.4	46.8	50.7	54.5	57.2	65.3	64.9	71.5	69.3	83.2	86.1	92.3
3	42.9	32.3	74.9	66.3	70.6	72.9	69.8	70.1	55.3	51.1	46.0	28.0
4	35.7	16.2	32.9	35.7	30.5	34.0	27.1	29.2	11.4	15.7	8.4	9.6
5	17.9	14.5	18.7	22.7	27.1	28.6	25.7	28.9	24.6	27.0	25.7	15.3
6	19.6	12.9	10.5	7.6	9.5	4.3	3.5	4.6	6.1	1.7	4.5	1.5
7	33.9	25.8	36.5	35.9	37.0	31.0	32.3	23.9	12.7	13.5	6.9	8.0
8	23.2	19.4	13.7	9.3	12.6	12.1	6.6	7.7	7.0	11.2	5.0	5.0
9	16.1	24.2	17.8	18.8	23.7	25.8	29.8	37.7	37.7	51.7	60.0	64.0
10	17.9	22.5	8.7	7.6	10.7	4.0	5.2	6.0	7.0	6.7	8.9	3.8
11	32.1	37.1	17.8	34.5	25.6	29.5	34.7	34.8	28.9	34.8	32.7	21.1
12	3.6	22.5	13.7	10.1	13.3	12.7	12.5	20.1	19.3	21.4	29.2	44.8
13	23.2	16.2	10.0	9.0	6.1	6.7	9.4	4.9	7.5	6.7	5.9	4.6
No. of Judges	56	62	219	356	262	329	288	284	228	178	202	261

TABLE III—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION C AS "BEST"

SERIES X

Set No.	Elementary School				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	69.6	82.3	85.8	93.0	90.1	95.2	95.5	90.8	93.4	94.4	91.0	97.7
2	10.7	13.0	9.1	11.5	6.1	13.1	9.4	11.6	18.0	11.2	17.8	6.5
3	23.2	38.7	50.2	50.5	51.5	49.8	50.3	39.8	28.9	41.6	35.6	32.2
4	17.9	17.7	25.6	18.5	16.0	16.1	13.9	13.0	10.1	9.0	6.4	4.2
5	28.6	30.6	28.8	29.8	16.0	17.0	15.6	16.5	18.9	13.5	13.4	4.6
6	8.9	9.7	12.3	13.7	14.1	14.3	10.4	10.2	9.6	14.1	12.9	5.8
7	44.6	45.2	49.3	52.2	48.1	46.8	45.5	35.2	26.7	23.6	16.8	22.6
8	3.6	6.4	3.2	6.2	3.1	2.4	1.4	1.4	3.1	1.1	.5	.4
9	12.5	14.5	16.0	17.7	17.5	25.8	21.5	27.1	36.8	39.3	55.4	64.0
10	12.5	29.1	12.8	12.9	14.1	8.2	4.9	4.2	7.0	2.8	4.5	3.4
11	10.7	16.2	18.3	15.7	15.3	23.1	21.2	14.1	20.2	20.8	22.3	22.2
12	30.4	37.1	37.4	45.5	42.0	51.0	52.1	42.6	53.5	39.9	41.1	36.0
13	14.3	27.4	26.0	28.9	23.7	19.4	25.3	19.4	19.3	20.8	21.8	23.3

SERIES Y

1	7.1	3.2	.9	1.4	3.1	0	.3	.4	1.8	2.8	1.5	.4
2	3.6	4.8	9.6	10.4	12.6	9.7	10.4	11.3	13.6	7.9	5.5	1.1
3	32.1	45.2	16.9	21.9	22.5	21.3	24.6	25.7	36.0	41.6	43.6	62.8
4	17.9	21.0	25.6	18.5	13.7	8.8	9.4	5.3	6.6	3.4	5.0	3.1
5	19.6	9.7	3.2	2.5	4.2	2.4	1.4	.4	2.6	1.1	0	.4
6	23.2	22.5	20.5	22.2	21.0	17.3	16.3	13.4	18.4	7.3	6.4	3.8
7	26.8	24.2	25.1	25.5	19.5	15.8	12.8	14.8	4.8	3.9	2.0	2.7
8	25.0	24.2	32.0	27 2	25.6	18.8	13.9	9.5	4.8	2.2	2.0	1.5
9	28.6	19.4	21.0	19.1	15.3	15.8	15.3	14.1	20.2	15.7	16.3	16.8
10	42.9	25.8	18.3	18.8	14.1	20.0	22.6	28.5	28.1	31.5	41.6	53.6
11	25.0	17.7	28.8	26.1	24.8	21.9	23.9	20.1	14.5	12.9	11.4	11.5
12	28.6	41.9	28.3	21.3	26.3	19.2	23.6	15.8	17.1	15.2	13.9	11.1
13	30.4	45.2	47.5	50.3	43.1	36.8	32.3	24.6	15.8	14.1	9.9	8.4
No. of Judges	56	62	219	356	262	329	288	284	228	178	202	261

TABLE IV—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION D AS "BEST"

SERIES X

Set No.	Elementary School				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	10.7	9.7	6.4	4.2	4.2	3.0	2.1	4.9	2.2	1.1	3.5	.8
2	44.6	27.4	51.6	60.4	71.7	66.0	73.0	73.9	66.2	78.7	74.8	89.3
3	16.1	17.7	11.0	7.3	9.2	3.6	3.1	4.9	1.7	.6	.5	0
4	59.0	48.4	50.7	60.4	52.7	48.6	45.8	45.4	37.7	40.5	33.2	31.4
5	17.9	38.7	42.0	51.4	69.8	69.9	71.9	69.4	71.5	78.7	83.2	92.3
6	53.6	58.1	53.4	51.1	35.1	24.3	26.0	13.4	13.2	11.2	6.4	3.4
7	17.9	17.7	13.7	13.2	13.7	12.7	11.4	8.5	7.0	7.9	6.4	.8
8	33.9	27.4	41.1	49.7	51.5	47.1	46.9	51.7	32.9	41.6	30.7	23.0
9	19.6	25.8	18.7	18.2	14.1	14.9	9.4	9.9	6.1	9.6	4.5	6.9
10	39.3	37.1	37.9	60.1	52.7	59.6	59.4	57.4	51.7	52.8	43.6	29.5
11	41.1	53.3	57.1	67.1	65.6	63.9	68.4	67.2	61.4	53.9	54.0	36.4
12	21.4	25.8	31.0	40.4	45.4	36.5	34.7	43.6	22.8	34.3	28.7	17.6
13	35.7	25.8	33.3	23.6	24.0	21.3	18.4	16.2	12.7	9.6	5.9	3.8

SERIES Y

1	1.8	4.8	5.0	5.6	5.3	4.6	2.1	4.6	3.9	3.4	3.0	0
2	17.9	8.1	5.9	3.4	3.8	.6	1.4	.4	3.1	1.7	.5	0
3	10.7	12.9	4.1	5.0	3.4	4.3	4.2	2.5	7.5	5.6	8.4	8.4
4	21.4	24.2	9.6	10.1	6.9	5.5	7.6	7.4	6.6	2.9	5.0	1.5
5	14.3	24.2	24.7	37.3	27.1	31.6	34.7	40.1	44.7	46.6	56.9	70.5
6	21.4	38.7	43.8	58.8	57.3	63.5	62.5	49.3	37.3	43.8	40.6	28.0
7	21.4	25.8	24.2	32.2	35.1	43.4	43.4	51.7	71.0	68.5	83.2	83.5
8	21.4	27.4	29.7	37.5	38.5	40.4	44.8	47.5	57.4	55.6	63.4	69.3
9	14.3	29.0	24.2	24.1	21.4	20.0	17.7	13.0	14.0	6.7	10.4	5.4
10	16.1	21.0	36.5	40.0	34.7	43.4	37.8	35.9	33.3	33.7	26.7	24.5
11	26.8	22.5	27.8	16.2	18.3	17.0	7.6	7.4	7.9	5.6	4.0	4.2
12	25.0	22.5	51.6	59.8	50.8	58.6	55.9	52.8	53.1	52.3	47.0	37.5
13	16.1	24.2	36.1	36.4	45.4	48.6	45.1	54.2	42.1	42.7	45.5	38.7
Judges	56	62	219	356	262	329	288	284	228	178	202	261

TABLE V—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION A AS "WORST"

SERIES X

Set No.	Elementary School				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	30.4	43.5	55.7	55.9	50.8	63.2	61.8	54.2	56.1	54.5	61.4	62.8
2	32.2	30.6	49.8	50.0	61.8	72.3	68.4	64.8	76.3	73.6	76.2	76.6
3	25.0	32.3	40.2	35.4	30.5	27.1	25.7	21.1	14.5	12.9	7.9	9.6
4	39.3	43.5	60.7	64.9	73.3	74.1	77.4	72.5	64.9	74.7	78.7	76.2
5	32.2	42.0	53.0	51.4	51.9	55.0	55.2	44.3	31.1	40.5	35.1	43.7
6	16.1	21.0	16.9	14.6	10.3	8.5	3.8	1.8	3.5	2.3	5.0	3.8
7	37.5	32.3	30.6	36.8	39.3	37.7	39.2	40.5	47.4	53.9	51.0	44.4
8	25.0	17.7	24.7	24.7	19.1	19.4	16.3	13.0	8.8	6.7	5.4	3.1
9	14.3	38.7	23.7	20.5	14.1	15.8	13.9	6.3	6.1	6.7	5.0	5.4
10	32.2	46.8	34.2	43.8	34.0	32.8	31.9	27.8	21.0	23.6	14.9	6.1
11	35.7	42.0	40.6	43.0	51.5	50.4	50.3	41.9	36.8	39.9	32.2	25.3
12	26.8	42.0	29.2	35.7	37.0	37.1	33.0	41.5	40.3	41.6	51.5	48.7
13	33.9	46.8	46.6	34.0	33.2	28.6	25.3	16.2	16.2	15.7	11.9	9.9

SERIES Y

1	30.4	24.2	42.9	41.0	32.4	28.9	23.2	29.9	29.8	30.3	30.2	29.9
2	14.3	25.8	10.5	8.7	5.3	3.0	2.8	4.6	3.5	4.5	3.5	4.2
3	32.1	29.0	45.7	47.2	46.6	62.6	57.6	54.2	58.8	59.6	65.8	77.4
4	23.2	16.2	15.5	7.9	12.2	4.0	3.5	3.9	3.5	1.1	2.5	1.1
5	21.4	12.9	9.1	10.4	9.5	6.4	8.0	7.4	14.0	11.8	11.4	17.6
6	14.3	29.0	31.0	28.6	29.8	20.0	18.0	13.7	12.7	12.9	7.4	3.8
7	27.5	30.0	35.2	42.7	39.3	35.5	29.5	27.4	16.7	13.5	8.4	12.3
8	28.6	25.8	32.0	27.2	23.7	19.7	13.9	12.3	11.4	8.4	4.0	3.4
9	21.4	22.5	11.9	14.9	13.0	11.8	13.5	11.3	12.7	13.5	19.3	16.5
10	33.9	35.4	30.1	36.8	25.2	28.9	33.3	83.1	20.6	21.9	29.7	21.4
11	39.3	25.8	32.4	26.9	17.9	15.2	12.5	13.0	13.6	7.9	9.4	5.4
12	19.6	32.3	45.7	37.9	35.5	38.6	35.1	33.1	39.0	39.3	33.7	40.6
13	35.7	50.0	53.9	53.9	47.3	36.5	33.3	27.1	20.2	18.5	14.9	12.2
No. of Judges	56	62	219	356	262	329	288	284	228	178	202	261

TABLE VI—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION B AS "WORST"

SERIES X

Set No.	Elementary School				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	33.9	42.0	28.3	33.4	31.7	19.8	18.4	28.2	23.7	21.9	15.3	8.0
2	16.1	14.5	13.2	12.9	12.2	7.6	11.8	12.0	4.8	8.4	5.9	4.6
3	17.9	14.5	9.6	7.9	9.5	3.3	5.6	4.2	4.4	2.8	4.5	1.1
4	39.3	21.0	16.0	17.1	9.9	9.4	5.6	6.3	3.9	2.8	1.5	2.3
5	23.2	27.4	27.4	33.7	35.9	31.9	34.7	48.6	63.2	51.7	62.9	54.0
6	46.4	58.1	48.4	58.7	67.5	62.3	64.9	58.8	57.0	56.7	55.9	36.8
7	21.4	21.0	17.8	15.7	10.3	11.2	6.3	3.9	3.5	2.3	1.0	1.1
8	19.6	11.3	19.6	14.9	11.4	13.7	12.8	24.6	20.2	27.5	20.8	25.3
9	28.6	17.7	23.3	22.7	30.9	30.1	32.3	39.4	43.0	47.2	44.1	26.4
10	19.6	29.1	21.9	30.6	29.0	28.6	32.3	39.8	43.4	46.6	54.0	44.1
11	21.4	24.2	25.6	32.0	24.8	27.0	27.8	33.8	38.6	36.0	45.0	44.1
12	25.0	21.0	32.9	35.7	40.8	40.4	44.4	39.4	32.0	32.6	24.8	22.6
13	21.4	13.0	13.7	17.1	18.7	10.0	13.9	12.0	18.0	13.5	22.8	16.8

SERIES Y

1	1.8	1.6	.5	.6	.4	1.2	.7	.4	1.3	.6	0	.4
2	21.4	27.4	4.6	3.7	3.1	1.8	3.1	2.5	1.8	.6	1.0	.8
3	8.9	9.7	1.8	4.2	1.5	1.8	2.1	5.3	7.5	7.3	8.4	7.3
4	8.9	9.7	11.0	12.1	11.8	10.9	13.2	14.4	28.9	18.5	27.2	19.5
5	25.0	22.5	8.2	14.6	7.6	12.1	7.6	6.7	14.5	10.7	9.9	12.6
6	25.0	22.5	28.3	43.5	44.6	53.8	53.5	50.7	47.4	43.8	49.5	49.8
7	10.7	14.5	6.8	12.6	11.1	16.7	12.8	15.5	28.1	18.0	28.2	24.5
8	17.9	14.5	25.1	31.7	30.5	33.7	35.4	30.3	22.8	20.8	31.7	19.1
9	37.5	22.5	42.5	35.9	35.5	29.5	28.1	28.9	29.8	18.5	17.3	12.2
10	12.5	14.5	27.8	28.9	35.1	42.8	37.8	41.5	43.9	41.0	38.6	36.8
11	14.3	22.5	29.7	24.1	32.4	28.6	24.3	24.6	18.9	19.7	18.3	23.4
12	17.9	35.4	21.5	30.6	23.3	22.2	23.9	18.6	20.6	17.4	11.4	11.9
13	17.9	19.4	23.3	26.9	30.1	39.8	38.9	38.8	35.3	37.1	35.6	36.0
No. of Judges	56	62	219	356	262	329	288	284	228	178	202	261

TABLE VII—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION C AS "WORST"

SERIES X

Set No.	Elementary School				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	3.6	1.6	.9	.6	1.9	.6	1.0	.7	.9	1.7	0	.4
2	39.3	32.3	27.8	28.6	19.8	16.4	17.7	20.1	14.9	16.3	14.9	17.2
3	25.0	29.1	15.1	15.2	11.8	10.3	9.4	11.3	21.5	9.0	10.4	12.6
4	10.7	21.0	11.0	9.8	9.9	11.2	12.5	13.0	19.7	12.9	8.9	11.5
5	19.6	21.0	8.2	8.4	8.8	10.3	7.6	5.6	3.9	5.6	2.0	1.9
6	17.9	8.1	26.0	16.8	14.1	12.4	14.2	13.4	11.4	16.3	9.4	23.4
7	8.9	17.7	23.3	14.9	17.5	18.2	19.4	21.1	27.6	14.6	25.7	14.6
8	26.8	40.3	39.7	44.4	53.3	54.4	60.8	50.7	50.9	57.9	60.4	49.0
9	16.1	22.5	17.3	22.7	19.1	16.4	14.2	14.1	9.6	9.6	3.5	1.5
10	25.0	11.3	22.8	16.8	27.1	29.8	26.7	24.3	28.1	20.2	24.3	40.2
11	21.4	21.0	16.9	16.3	16.4	17.0	16.7	19.4	17 5	17 4	14 9	12.6
12	8.9	8.1	10.5	3.1	3.8	5.5	3.8	3.5	6.1	3.4	5.9	6.5
13	28.6	17.7	18.3	20.8	28.2	33.4	25.3	35.5	33.8	23.0	24.8	20.7

SERIES Y

1	39.3	50.0	40.6	44.6	52.3	56.2	56.2	58.8	52.2	52.3	56.4	46.7
2	14.3	9.7	5.9	5.9	4.6	7.6	6.6	5.6	6.6	2.8	6.4	12.6
3	16.1	22.5	8.7	5.9	6.9	3.0	4.5	3.5	5.3	4.5	3.0	1.5
4	19.6	24.2	21.0	21.0	22.5	23.1	22.9	31.0	34.6	32.6	29.7	33.3
5	26.8	50.0	67.6	63.5	68.7	75.1	74.3	78.5	64.9	73.0	75.7	68.2
6	16.1	21.0	23.7	14.6	16.0	18.2	20.5	23.2	17.1	28.1	28.2	30.3
7	23.2	40.3	33.8	23.3	37.4	35.5	44.4	50.7	52.2	64.1	62.4	60.1
8	30.4	30.6	24.2	25.0	25.2	34.9	41.0	45.4	62.7	64.1	62.4	75.0
9	23.2	29.0	26.5	26.9	30.9	31.0	23.6	28.2	28.1	21.9	19.8	21.1
10	14.3	19.4	19.6	17.1	18.7	14.0	12.1	10.2	11.0	12.9	6.4	7.7
11	14.3	17.7	18.3	26.1	25.6	28.2	27.1	28.2	26.7	28.7	23.3	24.5
12	32.1	14.5	16.9	20.8	24.8	26.7	24.3	33.4	26.3	25.8	34.7	27.6
13	19.6	6.5	10.0	4.5	11.4	12.5	18.7	27.8	32.4	28.1	35.1	29.1
No. of Judges	56	62	219	356	262	329	288	284	228	178	202	261

TABLE VIII—PERCENTAGES OF GRADES OR GROUPS CONSIDERING VERSION D AS "WORST"

SERIES X

Set No.	Elementary School				High School				College			Grad. English
	5	6	7	8	I	II	III	IV	I	II	III-IV	
1	32.2	13.0	15.1	10.1	15.6	16.4	18.7	16.9	19.3	21.9	23.3	28.7
2	12.5	22.6	9.1	8.4	6.1	3.6	2.1	3.2	3.9	1.7	3.0	1.5
3	32.2	24.2	35.2	41.6	48.1	59.3	59.4	63.4	59.6	75.3	77.2	76.6
4	10.7	14.5	12.3	8.1	6.9	5.2	4 5	8 1	11 4	9.6	10.9	9.9
5	25.0	9.7	11.4	6.5	3.4	2.7	2.4	1.4	1.7	2.2	0	.4
6	19.6	13.0	8.7	9.8	8.0	16.7	17.0	26.0	28.1	24.7	29.7	36.0
7	32.2	29.1	28.3	32.6	32.8	32.8	35.1	34.5	21.5	29.2	22.3	39.8
8	28.6	30.6	16.0	16.0	14.1	12.5	10.1	11.6	20.2	7.9	13.4	22.6
9	41.1	21.0	35.6	34.0	35.9	37.7	39.6	40.1	41.2	36.5	47.5	66.6
10	23.2	13.0	21.0	8.7	9.9	8.8	9.0	8.1	7.5	9.6	6.9	9.6
11	21.4	13.0	16.9	8.7	7.3	5.5	5.2	4.9	7.0	6.7	7.9	18.0
12	39.3	29.0	27.4	25.5	18.3	17.0	18.7	15.5	21.5	22.5	17.8	22.2
13	16.1	22.6	21.5	28.1	19.8	27.9	35.4	36.3	32.0	47.8	40.6	52.5

SERIES Y

1	28.6	24.2	16.0	13.7	14.9	13.7	19.8	10.9	16 7	16.9	13.4	23.0
2	50.0	37.1	79.0	81.7	87.0	87.5	87.5	87.3	88.2	92.1	89.1	82.4
3	42.9	38.7	43.8	42.6	45.0	32.5	35.7	37.0	28.5	28.7	22.8	13.8
4	48.2	50.0	52.5	58.8	53.4	62.0	60.4	50.7	32.9	47.8	40.6	46.0
5	26.8	14.5	15.1	11.5	14.1	6.4	10.1	7.4	6.6	4.5	3.0	1.5
6	44.6	27.4	16.9	13.1	9.5	7.9	8.0	12.3	22.8	15.2	14.9	16.1
7	28.6	14.5	24.2	21.3	12.2	12.1	13.2	6.4	3.1	4.5	1.1	3.1
8	23.2	29.0	18.7	15.9	20.6	11.5	9.7	12.0	3.1	6.7	2.0	2.3
9	17.9	25.8	19.2	22.1	20.6	27.6	34.8	31.7	29.4	46.1	43.6	50.2
10	39.3	30.6	22.4	17.1	21.0	14.3	16.7	15.1	24.6	24.2	25.2	34.1
11	32.1	33.8	19.6	22.7	24.0	27.9	36.1	34.1	40.8	43.8	49.0	46.7
12	30.4	17.9	16.0	10.6	16.4	12.4	16.7	14.8	14.0	17.4	20.3	19.9
13	26.8	24.2	12.8	14.6	11.1	11.2	9.0	6.3	11.8	16.3	14.4	22.6
No. of Judges	56	62	219	356	262	329	288	284	228	178	202	261

Those who try the tests on their own students or teachers will find it very highly instructive and worth while to make similar diagrams to represent the votes of their groups on the various sets.

In addition to tabulating the frequency and percentage of instances in which each version was voted "Best" or "Worst," a score was given to each judge for each of the two series, according to the number of sets in the series in which he voted for the original as being the "Best." Since there are only four versions in any set, a judge who knew nothing about poetry at all and merely went through the series at random marking one version "Best" and another "Worst" in each set, would in 25 per cent of the cases mark the original "Best" and in another 25 per cent of his judgments mark it "Worst." The average score of such a judge from mere chance alone would be 3¼ right choices out of each series of 13 sets.

Table IX gives the distribution of scores on Series X and on Series Y, for each group of judges reported in Tables I to VIII and in addition for the miscellaneous group (M) of people not reported in the percentage tables. Beginning with the column in the upper left-hand part of the table, one may observe that for Series X in the fifth grade of the elementary school, 3 pupils voted for the right "Best" version in 8 of the 13 sets, 3 other pupils voted correctly in 7 of the 13 sets, and so on down to 3 pupils who voted correctly in none of the 13 sets. The total number of judges in the fifth grade was 56. The 50 percentile or median point for this grade was 3.9 right judgments, with half of all the pupils falling between 2.4 and 4.9 out of the 13 possibilities. It is evident that the judgment of fifth grade pupils, whose median is 3.87, is scarcely more reliable than the results of chance selections, with a median of 3.25.

It is interesting to note how slowly the median or 50 percentile point rises as one passes upward through the grades and to observe that the higher groups are more variable as measured by the size of the Q (Semi-Interquartile Range) then are the lower groups. Although such poems as are used in these series are frequently used in the schools, it is not until college classes are reached that half of the judgments of a class are right as to which version is "Best."

TABLE IX

FREQUENCY OF RIGHT CHOICES OF "BEST" VERSION FOR EACH GRADE OR GROUP

No. of Right Choices	Frequency for Series X in Grade												
	Elementary School				High School				College			Miscel.	Gr. Eng.
	5	6	7	8	I	II	III	IV	I	II	III-IV		
13	...	...	...	...	...	...	...	1	2	3	9	6	25
12	...	...	...	...	...	...	...	1	5	5	7	15	29
11	...	...	...	...	...	1	1	5	6	6	15	13	26
10	...	...	...	...	...	3	3	13	12	10	15	11	35
9	...	...	...	...	1	...	6	13	19	20	29	25	29
8	3	...	2	3	6	7	10	21	27	20	25	24	30
7	3	2	6	13	11	29	29	36	34	27	28	32	30
6	3	1	18	17	31	57	44	51	44	22	29	31	27
5	3	9	33	73	55	76	67	53	33	32	20	28	18
4	15	12	50	78	79	71	62	39	27	16	15	12	10
3	8	22	44	94	50	65	48	37	12	13	8	11	1
2	11	9	48	56	20	16	15	11	5	4	1	5	...
1	7	7	16	19	9	4	2	3	2	...	1	...	1
0	3	...	2	3	...	...	1	...	...	...	...	...	...
Total	56	62	219	356	262	329	288	284	228	178	202	213	261
25 percentile	2.36	2.95	2.77	3.12	3.73	3.96	4.10	4.51	5.33	5.36	6.19	5.90	7.36
50 percentile	3.87	3.68	3.99	4.08	4.66	5.11	5.24	5.98	6.80	7.07	7.96	7.61	9.47
75 percentile	4.87	4.70	5.13	5.23	5.70	6.26	6.48	7.53	8.52	8.98	9.85	9.67	11.57
Q	1.25	.88	1.18	1.06	.99	1.15	1.19	1.51	1.59	1.81	1.83	1.89	2.10

No. of Right Choices	Frequency for Series Y in Grade												
	Elementary School				High School				College			Miscel.	Gr. Eng.
	5	6	7	8	I	II	III	IV	I	II	III-IV		
13	...	...	...	...	...	...	...	1	2	3	5	13	23
12	...	...	...	...	...	...	1	3	2	9	13	10	31
11	...	...	...	...	1	...	...	7	10	7	17	13	34
10	...	...	...	...	...	1	4	8	14	15	17	25	29
9	...	...	...	4	...	3	3	17	18	12	18	25	35
8	...	2	1	5	5	10	17	19	32	24	30	27	35
7	1	2	4	11	14	29	25	29	32	29	36	32	25
6	2	7	15	31	30	40	54	53	35	21	28	22	21
5	8	16	35	62	54	72	64	47	38	25	21	13	18
4	15	12	62	97	60	84	49	40	22	18	8	22	6
3	16	9	55	83	51	63	37	37	14	10	8	8	3
2	8	8	38	49	35	23	27	17	8	5	1	3	...
1	6	6	9	13	12	4	7	6	1	...	...	...	...
0	...	...	...	1	...	...	...	...	...	...	...	...	1
Total	56	62	219	356	262	329	288	284	228	178	202	213	261
25 percentile	3.00	3.17	3.14	3.32	3.36	3.88	4.02	4.28	5.32	5.46	6.45	6.33	7.65
50 percentile	3.88	4.67	4.12	4.33	4.55	4.88	5.37	5.89	6.89	7.35	7.97	8.24	9.61
75 percentile	4.80	5.72	5.01	5.39	5.71	6.02	6.59	7.45	8.66	9.13	10.11	10.31	11.67
Q	.90	1.27	.94	1.04	1.17	1.07	1.29	1.50	1.67	1.83	1.83	1.99	2.01

The original or "Best" version in each set is noted below:

Set No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Series X	C	D	B	B	D	A	B	A	C	A	A	B	A
Series Y	B	B	C	A	D	A	D	D	B	C	A	B	A

No attempt has been made to include the choice of the worst version as an element in the measure of success in these exercises. We are not sufficiently sure which version is worst, since they differ in kind of perversion more decidedly than in degree. The attempt was made to learn from the expert group which are the true "Worsts," but it is significant that most of them expressed an opinion reluctantly, and several refused absolutely, declaring the spoiled versions equally bad. A fair probability of the true "Worst" is based on combining the judgment of experts with that of judges from the upper groups whose choice of "Best" missed the true version not more than once on the twenty-six poems. But it is safer to base computations wholly on choice of "Best," and to use the "Worsts" for corroboration of certain general tendencies, and for certain qualitative inferences.

In order to check the reliability of the tests at different levels of ability, correlation tables were plotted between the scores in Series X and the scores of the same people in Series Y, and coefficients of correlation were determined by the Pearson or Brevais formula, $r = \frac{\Sigma\, x.\, y}{\sqrt{\Sigma x^2}\,\sqrt{\Sigma y^2}}$. The correlation coefficients for the groups so tested and the number of persons involved in each measurement of the correlation of Series X with Series Y is indicated below:

Group of Persons Considered	No. of Persons	Correlation of X and Y
Seventh and eighth grades	127	—037
Second, third, and fourth year H. S.	127	.440
Miscellaneous educated group	187	.588
Second, third, and fourth year College . . .	273	.656
Graduate English Students	249	.723

The significance of these coefficients of correlation becomes somewhat clearer when it is stated that (according to William Brown's formula) in order to get an X Series that would give a correlation of .95 with a Y series,—that is, in order to get an X

series that would give to an individual judge almost exactly the same score as he would obtain in a Y series,—one would need to have in the graduate English group nine times as many sets of poems as we now have,—in the miscellaneous group fourteen times as many tests; and in the high school group twenty-six times the present number. In the elementary school there is no use trying to get enough sets together to make a reliable test.

The two series as they were scored, therefore, are worthless as a test of ability in the elementary school; they begin to take on some significance in the upper part of the high school and in college classes; and they are most reliable with university students and other specialists in the field of English. The present method of scoring is found, for example, to separate fairly well the adequately prepared English teacher from the teacher whose standards, in poetry at least, are no better than those of her students.

Furthermore, regardless of their value as measures of ability to judge quality in English poetry, Exercises X and Y may conceivably be of real value as teaching devices. A teacher might discuss the beauty of the rhythm in a given poem for a half-hour without giving the pupil a clear idea of the characteristic under discussion, but by means of the contrasts afforded in these exercises the value of rhythm could be almost instantly revealed. When used as teaching devices, however, these exercises would lose their value as instruments of measurement.

Although these exercises, as they stand, are not useful tests of ability in the elementary school and have only a limited validity in high school classes, they may well be used with such classes merely for the information they furnish the teacher regarding the tastes of the pupils. Such diagnostic study of the elements in poetry that appeal to students of a particular age, race, sex or social group will be very helpful to any teacher who cares to undertake it. Pupils in these early grades fail to make good scores simply because something other than the true combination of poetic qualities makes a greater appeal to their natures.

The unreliability of the scores in the elementary grades and lower part of the high school is due not only to the inadequate

method of scoring but also to a variety of other causes, some of which can be traced through the tables or through such graphs as are given on pages 112 to 114. In the fifth and sixth grades, discrimination is practically zero; the votes on almost all the poems except Mother Goose fall on or near the chance distribution of 25 per cent for each version. Thereafter, a real choice begins to show itself; but in only a few poems (X 1, 2, 5, and Y 1, 2, 4, 8) does it follow the normal type of steadily increasing concentration on the right choice. Instead, the early choice usually goes to one or another of the "spoiled" versions, which holds its popularity through a series of grades. In no fewer than twelve cases of the twenty-six (i.e., X 8, 10, 11, 12, 13, and Y 3, 4, 6, 9, 10, 12, 13) this has the effect of actually depressing the curve of "right" choice below the chance vote of the fifth or sixth grade, so that the true poet appears to lose even his chance audience, falling off in some instances to a meager five per cent, or lower, and not emerging even to the level of mediocrity until the college age. This phenomenon is markedly shown in the chart of Y 13 (p. 113) and less strikingly in Y 6 and 12 (p. 114). It appears chiefly in the more complex poems.

In some cases, notably Shakespeare's "Dirge" (X 11) this is due to an actual dislike of the right poem, as shown in the large number of votes it attracts as worst. This is true of X 10 and X 12, both "worst" until third-year high school; X 13, X 9, Y 13, "worst" until second-year high school. The repellant elements of these poems are not hard to detect; in X 11, the Elizabethan phrasing and imagery ("as chimney sweepers, come to dust"), in X 10, the restraint, and the very cleverness of its Eighteenth Century flavor; in X 12, the subtlety of movement, which is clearly taken to be metrical bungling; in Y 9, the dialect (most ungrammatical); in Y 13, the unusual metaphor. More significant, however, is the indication of what is preferred at each age after grade 6. The metrically disturbed version rises to first choice only twice; namely, X 12, where it is considered best through to the graduate school, and Y 10, where it remains above Tennyson's version until the second year of college, predominating also over the sentimental version in grades 6, 7, and I High. The case of X 12 has already been explained; most readers are not responsive to the fine adjustments of Masefield's rhythm,

and regard it as bad in comparison with the mechanical anapaests of version C. The reason for the vote on Y 10 is not so easy to see, in view of the very bad rhymes in the "metrical" version; perhaps there may be a preference for a certain light, tripping movement in it, as compared with the even, sedate, movement of Tennyson. To offset these two cases, however, there are fourteen in which the "metrical" version is ranked as worst, and recognized as such early in the grades by a large and increasing vote. Evidently disturbance of the rhythm spoils poetry for most readers; and they count it disturbance to introduce inversion of accent, unexpected pauses, and other subtleties.

The "prosaic" version has the largest number of votes in X 8 for grades 5 and 6; in X 9 through all the school years and two years of college; in X 11 and X 13 until the graduate school; in Y 5 and Y 9 until the fourth year of high school; and in Y 13 until the first year of high school. It is called the worst in the cases of X 2 and X 5 after the first year of college; in X 6, X 7, and X 10 after the third year of high school; in X 12 after the fourth year of high school; in Y 7 and Y 8 after the second year of high school; in Y 10 after the first year of high school; and in Y 12 after grade 7.

The seven "bests" are to be explained on the ground of this version being easier to understand; young people do not get the humor in the "The Baboon," or the crowded imagery in "Temptation," and "Dirge." On the other hand, as soon as they are old enough to grasp the thought of a poem, they resent having its imaginative power "stepped down" to a lower voltage.

The sentimental version is considered "best" in 16 cases, namely X 3 (grades 6 to III High), X 4 (to II College) X 6 (to I High) X 7 (to III High), X 8 (7 to IV High), X 10 (through II College), Y 3 (throughout except E), Y 4 (grade 5, 7, and 8) Y 6 (grade 6 to I College), Y 7 (to I High), Y 9 (to grade 7), Y 10 (grade 7 to II College, with exception of II High), Y 11 (grade 5, 6, and 8), Y 12 (grade 7 throughout, except E), Y 13 (I High to III, IV College). It is called "worst" only in Y I, which is mere gibberish, and Y 2, which is not only sentimental but a burlesque of over-ornate versification. The broad curve of sentiment reaches its peak in the high school years, but continues well into college. Only the group (not tabulated here)

of poets and literary men and women are sufficiently annoyed by false sentiment to give it, in a number of instances, a majority vote as "worst."

When one considers that these sentimentalized versions include such lines as "Tender, tender Sea Shell," "The happy brook frisked in the breeze, And sniffed sweet odors from the trees," "Sweet coal, I hear thy tender croon," "The sweet peas look too sweet to stay," "The roseate morn the cats doth chase," "The all-seeing Eye that sends the still, gray cat," the marked preference even in college for this silly gush over real poetry reveals a weakness in human nature, or in English teaching, or both, that demands serious attention. Granting that it is the nature of adolescents to express emotions over-intensely, to prefer exaggeration to restraint, their souls might at least be taught not to "throb and thrill" over sheer idiocy, like sea-shells "'neath tropic trees," or "Fell in a faint on the floor inside." Is it possible that further study might reveal a tendency in schools even to inculcate the liking for absurdly false sentiment,—perhaps an emphasis put upon it, even, by text book or teacher?

With regard to the selection of poems for the several grades, these tabulations indicate certain principles which should receive further study. In the first place, poetry written for children does not always win recognition from them. Mother Goose does so; Lucas's "Tea-Time" is appreciated much earlier than his "Potatoes," the youthful fancy being intrigued by the more exuberant "Ho for the hot Potato!" Miss Lowell's "Sea Shell" does not receive genuine appreciation before later high school,—four years later than the more objective Marmion passage. "Fairy Gold," likewise, in its delicate wit, is post-adolescent; the Jump Rope rhyme is the thought (its author hereby confesses) not of a child but of a father trying to supplant the gruesome but universal "Mother, Mother, I am sick." As for Tennyson's "White Owl," his lone belfry is entirely removed from the child world. Children prefer verses without subtlety, objective in mood, easy to understand, and in simple, strongly-marked rhythms.

Vigorously expressed feeling is the demand of the middle years,—upper grades, high school, and early college. Restraint, under-statement, are not for them, nor the delicate adjustment

of intensity of expression to the validity of its occasion. "My soul revolts at many things" is to them much stronger, much more resonantly sincere, than "My mind lets go a thousand things." Their emotions are all sunlight and shadow, "thrills and sobs." Poetry of a vigorous, unrestrained, and emotional type ought to meet their moods, provided always that the emotion is valid; that it has its source in genuine feeling, not affectation. Much work needs to be done in finding and in adjusting to the course of study more good vigorous verse in which the emotions are not too subtle and complex, not too individualized, and not in any case forced for the occasion. Experimentation might be carried on by making use of the ballads, of Burns, of Scott, of the best of Byron, of Kipling, of Vachel Lindsay, in comparison with the study, say, of the "Golden Treasury" or Milton's "Minor Poems."

As to the nature of poetic excellence in itself, or at least in its appeal to the race,—its social effectiveness,—there would appear to be some significance in the fact that so many of these poems, and practically all of the best of them, win recognition of their excellence only from the college groups, and sometimes only from the graduate student of English and from expert literary groups. Is modern poetry so specialized in its substance and in its technique, as to be the cult of a highly selected and highly trained few? Should poetry therefore be kept out of the schools altogether, as something—"too bright or good for human nature's daily food?" Or shall we say that the poetry that separates itself from the larger public, that creates a special cult of esoteric appreciation, becomes thereby minor poetry, and that the world can afford to let it go unheeded, while attending to the voice of poets who speak for, and to, the whole of humanity? These questions the present writers do not attempt to answer, but suggest them as subjects for further objective study.

THE DEMANDS OF THE TIMES UPON OUR SCHOOLS

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The subject of this article has been chosen to illustrate, and to present indirectly the very important point of view that education, if it is to meet its full duty, must order itself in relation to the social group as a whole. The position to be combatted is the tendency to treat education, actually if not intentionally, as if it were purely or mainly to prepare certain pupils to get on well in the world. Many an actual school does, in fact, so influence its pupils that henceforth they are concerned in selfish and partisan fashion primarily for the welfare of themselves alone, or, at most, of a small part of the total social group. The position here assumed is that our schools must consciously assume an important part in the attempt to effect a better state of civilization, and must determine their aims and consequent procedure in consistency with this duty.

What, then, is demanded? In particular, what demands arise from the present critical state of the world's affairs? How shall we estimate and judge this serious tide in affairs in order to get from it the best of guidance?

Truly, the present is a most momentous period in the world's history. When we consider how much is happening, into how few years the events are compressed, what results flow from them, how far-reaching is their influence, when we think of these things, the effect on the imagination is overwhelming. A decade ago, as we read or studied history, our thoughts at times dwelt musingly upon those interesting periods of the remote past that stand out in such relief. Our own times seemed so prosaic, so uneventful, that we perhaps envied the dwellers in that past the opportunity they had to witness those mighty events and share in moulding and shaping their outcomes. Our day will, in time, be judged no less interesting and no less momentous than those. The French Revolution may rival the present in the inten-

sity of some of its moments, but in the extent of the regions influenced our day is far greater. More is now happening, events move more quickly, more has been at stake than perhaps ever before.

And of particular concern to us is the fact that the part played by books and thoughts is greater than ever before. Larger numbers of people now read. The conscious study of society is far more general, and the interchange of views is greatly facilitated. If any one objects that the widespread reading and thinking today are but the "little learning" that carries danger in its train, we need neither admit nor deny, but only point out that if it be so, then the greater is the demand upon us to bring up a rising generation which is able to cope with the situation.

The thought is worth developing. In 1815 the Congress of Vienna took every conceivable precaution to determine for subsequent generations the paths that civilization should thereafter follow. They chose a path that represented reaction rather than progress, and what was the result? In answering, note that a generation is reckoned at 33 years. Add a half generation to 1815, and we reach the revolutionary period of 1830–32. Add the full generation, and revolutions again come, those of 1848. What does it mean? The movements of history are complex; but are we not forced to conclude at least this much, that no settlement of any great social question can afford to overlook the rising generation? When the half-grown boys of 1815 came to maturity they took matters ruthlessly into their own hands and overturned governments that a half generation before had been restored with so much care. In 1848, history again repeated itself.

Do we, in looking forward, face a future of revolutions? That changes will come, great and far reaching, no one can doubt. What these changes shall be and whether they shall come by revolution or in orderly fashion depend in large measure upon the character of the successive generations. Education, as the name for all moulding influences, is the great determining factor of character; it is our only hope for order. We dare not leave this matter to chance. Conscious education must lend its every aid. The result may depend upon what we today decide to do. In proportion as the present grows bigger with possibilities, and as

thought and character become increasing factors in shaping affairs, in just such proportion does our responsibility increase.

What is the situation confronting us? What do we see as we look over the world? The aftermath of the greatest war in history, millions upon millions killed, billions upon billions of property destroyed, new-made nations starving and quarreling as they starve, Russia in chaos, and other parts of the world little better off. Everywhere international suspicions, fears, selfishness, and, in too many cases, despair. If we look into the domestic affairs of our country, we find a like welter of unrest, strikes, threats, bitter partisanship, industrial warfare, class hatreds. Wherever we may look, at home or abroad, the future seems dark.

But let us look beneath the surface of this most discouraging situation, and see if more deeply moving tendencies may not furnish guidance. What is the characteristic feature of the period in which we live? Is there anything to distinguish it from preceding periods? The answer seems clear: our generation is distinguished by the growth of tested thought, and its application to the affairs of men. Other periods have thought, and thought acutely, but the characteristic features of our time are found in the tendency to test suggested thought in as objective a fashion as possible, in the accumulation of thought so tested, and in the disposition to apply this thought to improving the affairs of men.

Three far-reaching tendencies co-exist with this modern characteristic and receive greatly added impetus from it; namely, a tendency to criticize our social institutions, a tendency toward the aggregation of men in larger and larger units and their integration in ever closer relationships, and a democratic tendency. It is not suggested that criticism is a modern phenomenon. It is far otherwise. What is claimed is that modern criticism finds its chief support in the growth and application of tested thought. There is a seeming inevitability and relentlessness in the onward sweep of modern science that gives credence and acceptability to its criticisms. The successes of science make it bold; no region is exempt from its search. The faith that was once yielded unquestioningly to the church or to the Bible is now being transferred to science, and more and more our institutions are subjected to criticism. So long as tradition told us what to think, conserva-

tism held sway. Science introduces conscious questioning, and the disposition to change grows apace. The strength of this critical tendency is not yet at its height. We may confidently expect a stronger and more penetrating criticism to make a yet more inclusive scrutiny of human institutions and a yet more radical tendency to change things in accordance with criticism. Whether we approve or not, whether it be a Frankenstein or not, the spirit of criticism is loose in the modern world.

The second tendency is toward the aggregation of men in ever growing units and the integration of mankind in ever more numerous relationships. That this aggregation and integration grow out of the application of tested thought to the affairs of men needs no demonstration. To use the term "industrial revolution" almost of itself suffices to prove the contention. The point here insisted upon is that the process of aggregation still continues, and in such a way as to carry integration constantly with it. Before science had revolutionized our industry each community lived largely in self-sufficiency. What was eaten was grown in great measure immediately at hand, what was worn was made of materials produced nearby. The customary life of the majority of mankind was lived in small areas. As tested thought was applied to production, however, affairs changed. Home and shop industries gave way to the factory. More men were brought together in one organization, raw materials were brought from greater distances, and the products were sold over wider areas. Cities sprang into being. Transportation facilities have kept pace. Ever growing cities are joined in ever closer relationships with ever increasing areas. Aggregation and integration are thus practical correlatives. Nor is the end in sight. Every improvement in means of production, transportation, and communication but increases the tendency. As never before, we are members of one society. The evening speech of a prime minister is read by the whole world the next morning. A murder in southern Europe involves the whole world in war. A crop failure in a remote corner of the world threatens hunger for the poor of Europe. More and larger aggregations, closer and more numerous integrations; the entire world hangs together as a whole in a degree never known before. And again the end is not in sight. The process is endless unless civilization begins to die.

The third tendency, that towards democracy, is not so easy either to define or to explain, but its forward sweep cannot be questioned. Whatever else it may mean, it includes at least this: that the world and its resources and all human institutions exist for the sake of men, that men, not a few chosen and set apart, but all men, may live as well as possible. A tendency this was called, and properly so, for it is still far from realization; but a tendency it is, definite and pronounced. Whatever the Great War may have been in its inception, it came to be a question of democracy. Only on this basis could our side prolong the war; for the lack of this basis our enemy collapsed. And still again the end is not in sight; democracy will not stay its stride till many matters be set straight. Nor will the end then come, for it is an infinite world in which we live, and the spirit of human justice will ever find work lying at its hand.

As these three great social tendencies have received strength and impetus from the growth and application of tested thought, so do all, working together in their turn, lead to two conclusions especially significant for us.

The first is that authoritarianism in the affairs of men wanes to its death. The time was when kings held sway by a "divine right," about which their subjects were held to have no choice. Governmental control and its authentication were alike external. In recent times government increasingly derives its powers from the consent of the governed. External authority yields to internal authority. So with learning and knowledge; the time was when the *ipse dixit* of some master, the decree of some council or ecclesiastical potentate, the letter of the biblical text, sufficed to fix the doctrine. It is yet so with many. It is being more and more observed, however, that authority, formerly external and superimposed, is becoming internal and is deriving its just power from the internal process of its efficient working. Criticisms and democracy allow no resting place for authoritarianism as such. The internal authority derived from efficient working is the authority which alone can stand the test. It is the realm of morals that is now being called upon to yield its external authoritarian sway. To many of us the prospect is dismaying. But whether we like it or not the time is fast passing when an external authoritarianism of morals can be relied upon to give effective

guidance or control to those who stand most in need of it. Already a new generation that came to maturity during the war is asking why and why not, and will not be silenced by the traditional answers. What is worse, they are in large numbers answering their questions by denying any sort of authority, internal as well as external. The external authority of church or book has been in the past the reliance of many in questions of morals. But these external authorities have, for the many, passed beyond recall. For these, if morals are not to descend to a mere temporary expediency, some other basis must be found and found quickly. Herein, we who educate face a distressing situation. The downfall of authoritarianism elsewhere, most of us stand ready to approve; but what to do in the matter of morals constitutes one of our most serious problems.

More significant, if possible, is the second conclusion from the far-reaching tendencies discussed earlier; namely, that change is inherent in the very process of civilization, and, so far as it concerns human institutions, practically all embracing. It is only too true that many among us have been hoping and praying that affairs will at last quiet down and let civilization catch its breath. It is not improbable that the war has acted temporarily to hasten the process of change; but, taking centuries together, change will never cease. On the contrary it will almost certainly become increasingly rapid. What, do you ask, can be the justification for so disquieting a prophecy? Consider the facts. Civilization takes its character from, or better finds its character in, the fabric of human achievement known to us as tools, machines, and the like, and the correlative customs, institutions, and systems of thought. See what the single invention of the steam engine has done to change the affairs of men, or the telegraph, or the germ theory of disease. Every first class invention makes far-reaching demands for changes in human behavior and relationships. The increasing aggregation of human affairs hastens the spread of change. More first class inventions have been made in the past two hundred years than in the two thousand years before. We have every reason to expect, unless civilization goes to pieces, that the next two hundred years will show even more invention, because thought begets thought, and tested thought begets fruitful thought. If this be so, more change will come, and so *ad infini-*

tum. As inevitably as civilization continues to exist and thought continues to be itself, just so inevitably will changes come. We face, then, a world of inherent and unending change. What the changes will be, whither they will carry us, we know not. The only thing we can assert with certainty is that we face rapidly changing forces which are shaping an unknown future.

In view of all the foregoing, what shall we say are the special demands made upon us who teach? What characteristics are especially needed to enable the rising generation to meet its problems and difficulties? Some things can be named at once.

Among many changes that are to come, some will come about apart from our special efforts to bring them, perhaps even in spite of efforts to prevent their coming; others we can bring or not, as we like, and according to the fashion we choose. Change is inevitable but progress is contingent. It is, then, exceedingly important that the rising generation believe in orderly processes of capitalizing change rather than in violent and catastrophic measures. The road to revolution, if often traveled, can but lead to the death of civilization.

As the world faces many great and unknown changes it is possible that we, by taking thought, can prepare our youth specifically to meet that unknown situation. We must prepare them to adapt themselves, when the time shall come, to that unknown and shifting world. We must then, as far as we can, make our young people adaptable, capable of easy and intelligent adjustment. It is methods of investigation they must be taught, not specific solutions. That they shall think and not what they shall think must be our aim.

Since dependence is no longer to be placed merely upon authoritarian ethics inculcated by blind habit, we must seek an intelligent moralization. Moral habits? Yes. But moral principles as well. On no other basis can we expect our young people to adjust themselves morally to that ever-shifting world. If they do not have the "why" as well as the "what" of morals, they will not clearly recognize the moral demand in the changed aspect of affairs. To give them habituation only is to invite moral anarchy. This is indeed a great responsibility. The time once was when the school could say to the church, this matter of morals belongs to you, but, for good or ill, that day has passed. It is to

the school that society must look, and we can only meet our duty by building an intelligent moralization.

A fourth problem, perhaps less pressing than the preceding, is the demand that none of our youth receive only trade training. Trade training is needed, and it must be provided, but our working people need something more. We must have artisans who understand the "why" of what they do. Else they cannot coöperate consciously in what they do, and, more to the immediate point, they will be unable to adjust themselves to the shifting demands of new processes. Intelligent our workmen must be, for their own sakes as well as for the sake of their work. But even more, our workmen of all classes and grades, in common with all others, if there are to remain any who do not work, must be intelligent citizens. Anything else is dangerous to the welfare of society. No mere trade training. A more pernicious doctrine than that of merely trade training is not preached.

But the principles given in our analysis yield yet other guidance. Consider our international situation. The unending process of aggregation and integration has a very definite lesson for us. An inclusive integration is absolutely essential unless civilization is to fail. A round world was bound in time to return upon itself. As the seven petty kingdoms of England could not continue separate, but must unite in time into one inclusive kingdom, as the clans of Scotland could not forever continue in mutual warfare, but must unite to form one country, as in our country the thirteen original states could not walk independent paths, but must form, first the confederation, then a union, and finally make of this an indestructible union, so the same processes of integration are bringing the nations of the world together. Granted the continuance of the aggregation and integration, now steadily increasing, the time was bound to come when the multiplicity of mutual relationships would demand the joint intelligent solution of common problems. If nations are already so bound together that the assassination of one man in an obscure corner lights a fire that spreads over the whole world, if these things can happen, it would seem that the time has already come when some inclusive organization shall make such things impossible.

And what do these things mean for the teacher? They mean that we must build world-mindedness in our children, the ability

to see the world of humanity and not merely the people of our one single nation. It means further a positive world patriotism, an unselfishness in dealing with the mutual affairs of our countries. I am not saying that we should no longer love our respective countries. Far from it. But I do mean to decry a selfish patriotism that lets the immediate and apparent good of country outweigh considerations of right and justice and good will to men. The patriotic rivalry I would advocate is a rivalry to excel in helping mankind, and not rivalry in the exploitation of backward nations. The world-mindedness, we would build, must see the practical and moral impossibility of an exclusive national sovereignty. It was on this rock that Prussia came so near wrecking the civilization of the world.

Such a conception of world-mindedness means for our country, as also for other countries, a new history, a new geography, and new civics. It must be a history that unites and not one that separates. It must be a geography that teaches respect for other nations, that sees the whole world mutually interdependent. It must be civics that brings home to the individual his duties and possibilities in relation to others, and the like duties and possibilities of his nation in relation to other nations. The task is great, the schools cannot do all, but we can at least do our part to make the spirit of human brotherhood permeate the work of instruction.

We may also, from our analysis, get light on the domestic situation. In matters industrial, the tendency to aggregation has far outrun the spirit of democracy. So far, our organization has considered only, or mainly, the money outcome; we have too often forgotten the element of humanity. These men who work in factories are not merely producers or money makers, they are also men with passions like our own. We have been prone to forget this, and have left democracy out of account in our industrial affairs. If our analysis is valid, we may be sure that in some way, somehow, the spirit of democracy must enter also the industrial realm. We cannot say what specific form this will take, we do not know, possibly no one has as yet even conceived a suitable plan, but this we can rely upon; unless the worker lives in his work as well as from his work we are going to have unrest forever. And this holds of all kinds of workers. We must live in our work as well as from our work.

What is then demanded of the school? That it build in its pupils breadth of view in social and economic matters, an unselfish outlook, a sense of responsibility for improving affairs, and such an ability to think as will keep our pupils, grown to maturity, from being the prey of demagogues. Regard for these things should permeate all our teaching. Every time one of us faces a class our aim should be to lead our students to a firmer grip on such attitudes. The school must provide opportunities for cultivating breadth of view, the sense of responsibility, and the ability to weigh arguments in social and economic matters. Practice in these is necessary to build them firmly. The very manner of conducting the class will have no small part in the matter. The unselfish attitude will prove difficult to attain, but a sense of fair play in life's affairs can be built up at least within certain limits.

The school we have inherited has come down to us from a remote past when education was mainly designed on the one hand, to inculcate docility and on the other to impart bare knowledge or skill. These things no longer satisfy. The duty of the school is now as large as is the life of the child who is to live in the democratic society of the future. It is our part to see that the ideals and attitudes necessary for that democratic life enter into the very innermost souls of our young people. In no other way can we meet the demand of the times upon our schools. In preparation for that unknown and changing future, books and examinations are not sufficient. Ideals and attitudes are immensely more important. Among these, three ideals especially stand out as worthy of our every endeavor, unselfishness, adaptability, responsibility.

HORACE MANN STUDIES IN ELEMENTARY EDUCATION

Project Teaching in an Advanced Fifth Grade

By MARIE HENNES
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In the fall of 1919, it was decided to continue in the fifth grade of the Horace Mann School the experimental work which had been fully organized in the first four grades.[1] In considering the changes, it seemed to involve a modification of "method" rather than of "content," though changes in content are bound to follow as a result of changes in method. It was essential, therefore, to have clearly in mind the distinguishing characteristics of this type of procedure, as compared with that commonly found in the better schools of America.

The aims of the modern school, as stated by Dr. Kilpatrick in his "Theories Underlying the Experiment" (Teachers College Record, March, 1919, pp. 99–100) were very helpful in this connection. "As we see it," he wrote, "the things that young children should especially learn may be grouped under four heads: (1) There are certain things in the world of common affairs which children should learn. They should learn the physical properties of things. They should become more or less familiar with the commoner animals and plants. They should learn many things of the ordinary social life about us, including, in particular, the use of such tools, implements, and materials as will serve best to introduce them to the larger social life which they are later to enter. (2) There are certain social ideals and skills absolutely necessary in order to live unselfishly and helpfully in society with their fellows. Our children must learn how to coöperate. They must learn the spirit of mutual helpfulness. They must come to appreciate fair play, and thus become unselfish in their dealings with others. They must, in particular, learn to be truthful. (3) There are certain more personal atti-

[1] See Teachers College Record, March and May, 1919, September, 1920.

tudes necessary, both to the success of the individual and to the welfare of the society of which he is to form a part. Among the foremost of these, we may mention self-reliance in making and executing plans, and a sense of responsibility. (4) There are the school arts; especially reading, writing, and arithmetic. It is this last group that the older schools considered as almost alone worthy of their specific consideration. In our judgment, however, the other three are not only no less important, but in certain respects even more important, because they underlie the discharge of one's duty to himself and to society. Without them, a merely bookish education may be a menace."

With these principles in mind, the first question that occurred was: "What will be my aims or objectives for the year?" They may be stated briefly as follows. (1) To learn to understand better the community in which we live, so that we can help it more by understanding it better. Under the old terms of subject-matter, it would involve a study of geography, civics, and history. (2) To help in community activities, such as Red Cross drives, pageants, maintenance of libraries, and other worthy public enterprises. (3) To be of some service to others not of the group. (4) To improve their health by learning and observing the laws of health. (5) To learn to understand and appreciate a greater variety of literature, music, and art. (6) To help the group attain the standards set for their grade. (7) To have a happy and helpful year together, wisely balancing work and play. The purpose of this report is not to give a full discussion, but to present a few points of departure as illustrations of the use of subject-matter required by the method used.[2]

For the purposes of the experiment, very slight changes in the environment were made, and no selection of pupils was undertaken. The classroom is of the ordinary size. The classes average about thirty boys and girls, ranging in age from eight to twelve. The majority of them have come up through the school, though about twenty-five per cent are outsiders. Those that are former students of the school, however, have come from four or five different rooms. They are normal children, one-half year more advanced in preparation than the regular fifth graders; hence

[2] For a more detailed report see Bonser, *The Elementary School Curriculum*, pp. 107–108.

the term "advanced fifth grade." The difficulty of welding them into a social group is apparent. The extent to which I could alter my equipment was slight and insignificant. The fixed desks and chairs were to remain. We always had some odd chairs placed in a circle. "Our magic circle," as the children called it, was used for discussions when we wanted to escape the formality of the fixed rows and have a more truly social situation. Two work-benches, with the ordinary equipment of tools, a large rough table, and sixteen new lockers, where the pupils could keep additional materials, were installed. We were none the worse off for being asked to experiment with the usual schoolroom equipment. All the very noisy activities, those which required a great deal of sawing and hammering, we agreed to save for the workshop, which we were allowed to use an hour and a quarter one day a week.

As was previously stated, our chief aim was a modification of method rather than content. We held ourselves responsible for the regular curriculum of that grade and sought to stimulate and encourage such projects as would involve subject-matter prescribed in that curriculum. It stands to reason, however, that in trying to work out a method which put a premium on children's wholehearted activity, an intelligent observer could not help but notice that subject matter which the adult had considered exceedingly important for a certain grade might, perhaps, fit in later on. Therefore, it is only natural that changes in method would be followed by changes in the content of a curriculum. Immediately, many questions will arise, one of the most important being, "What will you do if a project involves subject matter that is not prescribed for that grade?" To be very specific, "What will you do if the group raise a problem in geography involving the study of Egypt, and your geography course does not permit you to teach it?" A general guiding principle was to satisfy every question, but to satisfy in detail only those which fitted into the requirements for that grade

The first day I met my class in September was spent quite differently from the other first days of school that I remembered. The usual procedure had always been to complete the formality of registration, to hand out the list of supplies and books, and after the program or daily schedule

had been put on the board and copied by the students, to begin the regular daily work.

After registration had been completed this year, I made a few introductory and explanatory remarks to the children to make clear to them the fact that our year's work together would be somewhat different from what they were used to. They were asked what they hoped to accomplish during the year. For a moment they were puzzled. The responsibility of planning their year's work, and setting up their own aims was new to them. After brief reflection, they asked whether it would be permitted to talk it over with each other and with their parents? It was decided that this was a wise plan to pursue, and that we would keep adding to our list of aims as new ones occurred to us, or as the need made one evident. The complete list of aims, in the children's own words, follows:

A. We want to be a good citizen of this group. Therefore,
   1. We must be attentive when the teacher or a pupil is talking.
   2. We must coöperate.
   3. We must not interrupt others.
   4. We must be prompt and obedient.
   5. We must be honest and trustworthy.
   6. We must have self-control especially when the teacher is out of the room.
   7. We must be ready for work even if the teacher has been delayed.
   8. We must not leave a task till finished.
   9. On coming into the room before school in the morning we must be quiet, and take out a book to study.
   10. We must keep our room tidy and attractive.

B. We want to improve in our studies.
   1. We want to do our best always.
   2. We want to master our difficulties.

C. We want to continue the work for the Willard Parker Hospital.

D. We will try to form habits that will keep us in perfect health.
   1. We must go out every recess.
   2. We must not put materials, fingers, and other things in our mouths.
   3. In cold weather we must put on wraps before going out.
   4. We must brush our teeth at least twice a day.
   5. We must prevent getting feet wet.
   6. We must keep our bodies clean.
   7. We must exercise out of doors, but not after a heavy meal.
   8. We must sleep at least ten hours with windows wide open.
   9. We must not bite our nails.
   10. We must not eat between meals.
   11. We must stay away from other people, if we have colds.

E. We will ask Mr. Meister to help us understand better the things right around us.
F. We will keep informed in current events by reading the daily papers and magazines.

When children come to you as fifth or sixth graders, they are aware of the purpose of the school; they know that promotion depends upon the acquisition of knowledge and skill. They realize what they have done in the previous grade and wish to build on it. Therefore I was fully prepared for the question, "What are we supposed to cover to get into Miss K.'s room?" If that question had come, I should have answered it very frankly by turning the curriculum over to them and observing what they would do with it, helping them to purpose and plan well. They did not ask the question, however. Instead, they immediately listed activities in which they might engage in groups and individually. A list of the projects proposed and begun during the first three weeks of school follows:

1. To keep up in current events by reading the daily newspaper and magazines.
2. To make a Christmas box for some needy family or institution.
3. To keep diaries to convince *ourselves* and our parents that we are making progress.
4. To publish a monthly magazine.
5. To be tested in what we had in arithmetic and spelling in other grades to show where we need to improve.
6. To make our room attractive by keeping it clean, bringing flowers, etc.
7. To keep our accounts of the supplies we buy.
8. To weigh and measure ourselves every two months to see what we have to do to be healthy girls and boys.

This was the beginning of our curriculum, and it was my responsibility as the instructor to see the possible subject-matter in solution. There is a grave danger to be kept in mind here; namely, that of allowing the children to work along on the same level, and to neglect to enrich their lives with the storehouses of subject-matter that is available in books.

After the activities had been listed, the questions were asked: "Shall we need anything to guide us in our work each day?" "Do father and mother work without any kind of a plan?" Unanimously, the group felt we needed a time-schedule, containing the things we planned to do each day, so that we might work more

efficiently. What should we put in it? Who should make it out? We agreed to plan together, as far as we possibly could, as to what we could list on our program, and how much time to give it. Since certain periods on certain days had to be left open for specialists to give us their expert advice, the planning was complicated. For that reason, the group naturally called upon me for my expert judgment oftener than in the earlier planning. We decided to have a certain time for the following:

1. The morning conference. A period for reporting upon current events, interesting projects, and problems. Difficulties arising in connection with these matters call attention to the necessity of drills. This period always ended with an outline of the plan for the day.
2. The drill period. To be used for drill on such skills as were required for the projects in hand. This period included such formal studies as arithmetic, language, and spelling.
3. The problem period. For finding out the why, how, and what of current event items, problems raised by the projects, etc. This provides for geography, history, and science.
4. The special project period. The opportunity for individuals and small groups to carry on activities of special interest. This applies especially to industrial arts and science, but it is not at all unusual for a group to work at dramatics or the composition of short stories or poems.
5. The appreciation period. A time for the enjoyment of stories, poems, and pictures.
6. The recreation period. To be spent in the gymnasium.

The program as finally made up read as follows:

<table>
<tr><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr>
<tr><td colspan="5">Morning Conference 8:45–9:15</td></tr>
<tr><td>Drill Period: Arithmetic 9:15</td><td rowspan="4">Industrial Arts 9:45 to 10:50</td><td>Drill Period: Arithmetic 9:15</td><td>Drill Period: Arithmetic 9:15</td><td>Drill Period: Language and Composition 9:15</td></tr>
<tr><td>Problem Period Geography 9:45</td><td>Problem Period Geography 9:45</td><td>Music 9:45</td><td rowspan="2">Calisthenics 10:15</td></tr>
<tr><td>Calisthenics 10:15</td><td>Calisthenics 10:15</td><td>Problem Period Geography 10:05</td></tr>
<tr><td>Drill Period Spelling 10:20</td><td>Problem Period History 10:20</td><td>Drill Period Spelling 10:35</td><td>Literature 10:20</td></tr>
</table>

Recess 10:50–11:05 .				
Science 11:05	Assembly 11:05	Science 11:05	Assembly 11:05	Assembly 11:05
Literature 11:35	Chorus 11:30 Calisthenics 11:55	Drill Period: Spelling 11:35	Fine Arts 11:25	Fine Arts 11:25
Gymnasium 12:00	Drill Period Language and Composition 12:00	Gymnasium 12:00	Problem Period History 12:00	Gymnasium 12:00
Special Project Period 12:30	Problem Period History 12:30	Special Project Period 12:30	Special Project Period 12:30	Special Project Period 12:30

It is particularly helpful, in fact very necessary, to keep a record of the activities on one hand, and the subject matter involved on the other; to mark the subjects touched upon in a project, and the amount of ground covered in each respective subject. The teacher is thus enabled to survey her field more wisely and adequately for the future. Such a record serves as a diary of the past as well as a guide for the future.

It was very interesting to observe to what extent we were covering the subject matter prescribed in the old curriculum through the pupils' projects. A portion of the record that was kept, showing how the curriculum materialized under this mode of procedure, follows:

THE CHILDREN'S PROJECT:	THE SUBJECT-MATTER INVOLVED:
Class and individual budget for miscellaneous supplies. Teacher deposited amount of money requested from each child in the bank. Children were given individual check-books with which they could purchase their supplies at the college book store.	How to keep a check-book. How to keep a personal account-book. Talk on general banking in connection with the deposit of money in the bank. Difference between a check and savings account. Meaning of interest. How to compute interest. Rates of interest given by banks.
1. Christmas box for a poor family or institution.	1. Oral composition: Speech contest by pupils as to who should get the box. Every pupil, who was anxious to win the box for his or

THE CHILDREN'S PROJECT	THE SUBJECT-MATTER INVOLVED
	her poor family or institution, prepared a short speech to the group in which they set forth their plea. Then the group took a vote. A girl won it for the Willard Parker Hospital because of her direct and forceful appeal. Discussion with the group. Why that pupil's speech won the box for her hospital. The standards for a good speech. 2. Letter writing: A letter to hospital to find out condition and needs. 3. Industrial arts: Making of toys, sewing of nightgowns, use of a commercial pattern. 4. Cooking: Light cookies and candies for the sick children. 5. Written composition: Story, poem, and scrap-books. 6. Art: Illustrated books, artistic little tags for parcels when gifts were wrapped.
2. Diary kept by each child.	1. English: Source of language and spelling work.
3. A monthly class magazine.	1. Oral compostion: Speech contest as to how to name our magazine. 2. Written composition: Stories and poems, riddles and jokes, reports as to the activities in the various departments. 3. Art: Covers and illustrations.
The morning conference, in which current events were reported, gave rise to almost all our problems in history and geography. The following will serve as illustrations:	
1. A report on the recent steel strike led to the following questions by the group.	1. Geography: A study of the mining sections in the middle Atlantic and southern states. Is steel manufactured where the iron is mined? Where are the mining centers? Where are the manufac-

The Children's Project	The Subject-Matter Involved
	turing centers? How is steel made? Do we produce all we need? 2. Civics: Why are the men on strike? Is the cause a just one? Can those troubles be settled in a better way than by strike? 3. History of the United States: When do we first hear of strikes in the United States? For what did they strike then? Have their causes changed?
2. Report on the threatened coal shortage for this year and a very cold winter predicted. Pupils recalled the shortage of two years ago. "What were the reasons then? What are they now?"	1. Geography: Coal producing sections in middle Atlantic states. Where is the coal produced? How mined? How transported and where? How will a shortage affect us?
3. How can we predict the weather?	1. Science: Class organized into a weather bureau, studied government weather-maps, made a chart predicting the weather for the next day from certain data they collected.
4. Report on pros and cons of League of Nations, mentioned the Monroe Doctrine, what is it?	1. History.
5. Report on race riots. Why is it that a negro is not respected like a white man.	1. History; the Civil War.
6. Report on trouble with Mexico led a pupil who had been there to make the statement: "We ought to fight Mexico, we could go right in and wipe them out." Immediately others asked: "Would it be so easy to do that?"	1. Geography: a study of Mexico.

Throughout this fragmentary report one will see ample opportunity for drill. The question that naturally arises: "What is the place of drill in project teaching?" deserves a far more detailed treatment than can be given to it at the present time. Let it suffice to call to your attention the importance and interest of

children in "drill projects." Note, however, the difference between the abstract drills for which the pupil sees no reason, which are forced upon him by the adult, and a situation like this: Frequent errors are made in subtraction to find the amount to be carried forward in the check-book. Realizing the necessity of utmost accuracy, it is necessary to perfect himself in this operation. The Courtis tests in subtraction serve as a helpful agent.

Another interesting field for observation was the effect of this method upon the learner. It would be exceedingly valuable to get the reaction from three sources: (1) from the teacher; (2) from the parent; (3) from the learner. In this report it is impossible to incorporate the reaction from the parent because the time was too short. As far as the teacher is concerned the following points were noted: (1) There was never less disciplining to do than in working with the pupils in this wholehearted way. To begin with, the atmosphere of the schoolroom was coöperative. The center of gravity was not the teacher, but the group which was working with her on the principles of the democratic society. No rules existed at the outset. If it was necessary to make one, it grew out of an existing condition brought to a crisis which made us realize our needs. Not only were the rules made by the group, but they also saw to it that they were carried into effect, the teacher often being used as a final court of appeal. (2) There was a greater interest in the work on the part of the pupils. Their time was used to better advantage, for there was always a project which occupied the pupils' attention and on which they were anxious to spend such spare moments. (3) Hand in hand with project work, we naturally expect a development of individuality and unfolding of character. The teacher assists not only in wise-purposing on the part of the pupil but also must plan wisely how to carry out the activities. While reforms in modern education have been going on, teaching the child how to purpose has received a great deal of attention. For that reason teachers have succeeded in developing a technique along this particular line.

A new emphasis is also placed by the project method upon the process of planning. It is a very slow process of development to help a child with his meagre little plan, to help that plan to grow and improve. It is especially difficult for the mature person to

conceive and develop a technique along this line, because we have always been so used to forcing our adult plans on the immature child. To allow them to make their own plans takes time, and time is a very valuable thing. In order to justify this apparent loss of time, we must change our point of view. We must realize first of all that it is a slow process, but that it is worth while in the end. We must ask ourselves what is normally the next step to take, and we must get the student to think similarly. Just as soon as we permit this plan to go on in the schoolroom, we shall find as many individualities as there are boys and girls in our charge. Many a boy or girl who has sat in the classroom with a perfectly passive attitude turns out to be a leader in this or that way. That leads us to the question; "Does this method appeal equally to all pupils? Is it a method just for the so-called genius and the quick alert child?" We all realize that there is, also, quite a different type of child, the slow, inactive, passive type. An answer to this question necessarily requires observation over a much longer period than the one year of this experiment. One of the greatest pleasures and benefits derived from such experimentation is the renewed stimulus to go on and try to solve some of the vital problems which arise in the course of this procedure.

To find out the reaction of the learner, a morning conference period was devoted to the discussion of this question: "If you worked differently last year from the way we work this year, which do you like better? Why? We want this information for the benefit of the class that is to follow you, so that they can profit by your experience." Some of the answers most frequently given follow:

1. I like it better because it is more interesting.
2. I like talking about current events in the morning conference because they are so interesting.
3. I like this way of working because it gives you just what you want to find out, and you can ask your own questions.
4. I like it because I learn more than I can use now.
5. I like it because it answers the questions I really want to know.
6. I like it because we select the work. In the other school the teacher did everything.
7. I like being able to check up on my own work because I can see if I'm making progress.
8. I like it because I learn more.

9. I like it because it gives me a chance to use self-control.
10. I like it because you have more freedom. You can choose more.
11. I like it because we can work on and improve our own special difficulties.
12. I like being able to plan our day's work. It isn't like "school" where the teacher tells you what you have to do next.
13. There is always something of interest to do.
14. I like our discussions in the circle.
15. I like being able to elect our own officers instead of having them appointed by the teacher.
16. I like keeping our own check-books.
17. I like being able to help plan our work for the year.
18. I like being able to use many books and look up work because it makes the recitation more interesting. Before, I was allowed to use only one book, and all girls and boys had the same one.
19. I like being able to help each other. We are more of a unit.

As was stated, my purpose in this article is to present illustrations of the methods by which the subject-matter of the advanced fifth grade was treated according to the principles of project teaching. A complete account of the year's work would be material for a much more extensive report. If I have conveyed to the reader the conviction that the amount of progress in the required knowledge, the social ideals and skills, the necessary personal attitudes, and the fundamental school arts has been secured through the active coöperation and initiative of the children, rather than through the imposition of tasks by the teacher, the purpose of the report has been accomplished. More important than this, however, is the fact that the personal attitudes and social ideals have been given a kind and degree of exercise that they could never have had under the second method mentioned. The subject-matter has been studied and learned; but, in addition to this, habits of self-reliance and mutual helpfulness have been given a chance to form themselves.

THE STALKING OF THE VITAMINES

By WALTER H. EDDY
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It is only a decade since Casimir Funk attached the name vitamine to the substance which had been found in the polishings of rice and in yeast, the lack of which proved to be responsible for a human disease, the beri-beri of the orient. To-day the public press and many advertisements loudly urge the world to eat this or that food because of its vitamine content. The name has passed from the status of a chemist's guess as to the nature of an obscure chemical compound, to a place in the everyday discussion of the mothers of babies.

In a previous article in THE RECORD,[1] some of the reasons for this sudden interest on the part of the public and some ways in which our own institution has contributed to the knowledge of vitamines and their value, were briefly outlined. If I were to quote the most frequent dialogue with the readers of this first article, it would run somewhat like this: "You say that there is a vitamine which prevents scurvy, another which prevents beriberi, and a third which prevents eye-disease, and that all are essential to normal growth?" "Yes." "You say further that while we know what they do, and where to find them, no one knows what a vitamine is?" "Yes." "Then how can you tell whether a given food contains them or how much it contains?" It is at this point that monosyllabic replies fail, and one is forced into a description. It would be much simpler if one could say at this point: "If you are interested in that side of the matter, I advise that you read the account in such and such a book, where you will find that phase of vitamine study presented simply." Because there is no such general treatise, it has seemed to me that a simple account of how the game is stalked and hunted to its lair might be of general interest to the readers of THE RECORD. It is my desire that the mystery of the laboratory be stripped from a matter which justifies keen interest on the part of the layman, and of the student of dietetics in particular.

[1] TEACHERS COLLEGE RECORD, March, 1920.

Among the matters on which we have at present all too little data, is the question of the effect of different methods of cookery upon the vitamine content of foods. McCollum has called the attention of the world to the fact that we eat as a rule, too little of the green vegetables and of the dairy products and rely too much on meats and root vegetables, and that, while the latter are adequate in calories and proper nutrient proportions, they lack essential vitamines. From other sources we know that the vitamines are more or less sensitive to heat, alkalies, etc., but here our data are extremely limited and our conclusions far from definite. We know, for example, that a continuous heat of 145 degrees Fahrenheit, used in pasteurizing, is more destructive to the antiscorbutic or "C" vitamine than is a boiling temperature applied for only a few moments. We know that heated cabbage, in the process of cooking, loses almost six-sevenths of its antiscorbutic power, but that orange juice and tomato juice can be heated to a high temperature for a considerable period of time without any appreciable destruction of the "C" vitamine. Certain authors tell us that vegetables cooked with baking powder do not lose enough of their "A" and "B" vitamines to make the process significant. Another tells us that this heating is very destructive to them, but, that since a very small amount of vitamine is all that is necessary to produce normal growth effects, we do not observe our losses in this cookery. Why all this confusion? It lies mainly in lack of data. The number of workers in the field is increasing daily, but much of the research is directed toward the nature of the vitamines themselves. This is, of course, the goal of every chemist. Again, many people are deterred from entering the field from lack of knowledge of how to proceed, and from fear that the entry involves an extended study and a special technique. I do not wish to encourage superficial investigations, but, among the students of dietetics, nutrition, and allied fields, there are many who could become efficient witnesses in this work, if they but knew what to look for and how to observe.

For these and other reasons, I wish to outline here a simple account of what the past ten years have taught us, and the methods of testing that now are standard in examining substances for these unknown factors, or for comparing the vitamine content of one substance with another.

1. When Casimir Funk made his extended study of the chemical fractions of an alcohol extract of rice polishings, and later of autolysed yeast, he made use of a discovery of the German chemist Eijkman, published as far back as 1897. Eijkman had found that, by feeding common fowls or pigeons on polished rice alone, he could induce in them a paralytic effect called polyneuritis, which is comparable to the beri-beri of man. Later, Fraser and Stanton had shown that an alcohol extract of rice polishings, administered to birds so sickened, would cure them in from six hours to a day. When it was established that the same treatment when applied to beri-beri cases resulted in cure, and that which cured birds and man was the antineuritic vitamine, we had not only a discovery but a laboratory method for testing for the antineuritic vitamine which has become one of our standard methods of to-day. This use of polyneuritic birds, therefore, constitutes the earliest method employed. The procedure is obvious. By feeding pigeons on polished rice alone we can induce in them, in about three weeks, striking paralytic symptoms. If now we feed them a substance whose vitamine content we wish to determine, or inject into them an extract of this substance, the recovery of the bird is taken as a positive answer to the experiment. Failure of the bird to recover indicates an absence or an insufficiency of the substance in the dosage given. Such tests can be used for qualitative analysis of sources of the antineuritic or "B" vitamine, and are extensively used for this purpose to-day. Unfortunately, however, it has been found that certain other substances have a favorable influence on this disease, and the test is not considered nearly so conclusive as it once was.

2. The work of Mendel, Osborne, McCollum, Steenbock, Sherman and others, in this country, and of Hopkins in England, has introduced a system of tests that is much more universal of application at present and which we class, generally, as feeding-tests. Osborne and Mendel laid the foundation for this work in their experiments devised for an entirely different purpose. They published, in Bulletin 156 of the Carnegie Institution, 1911, the results of a long series of studies on the effect of feeding single purified proteins in the diet, and gave us the evidence on which rest to-day our theories as to protein quality. In the

previous article, we traced the relation of these studies to the discovery of the growth-stimulating power of the "B" vitamine, and the discovery of the "A" vitamine in butter-fat. I mention it here to call attention to another feature of the report; namely, the account found therein of how to use the white rat as a feeding-test for the efficiency of a dietary factor. No other laboratory animal has been so standardized as the white rat unless it be his companion, the guinea pig. Dr. Donaldson of the Wistar Institute has published the accumulated records of measurements, made at that Institute over wide ranges of years, in a volume entitled *The Rat*, published by the Institute in Philadelphia. This volume puts in the hands of the experimenter a complete set of standards for comparison, and makes the animal ideal for laboratory study. These facts, considered in connection with the omnivorous appetite of the white rat, and its ready adjustment to confinement and experimental conditions, attracted the attention of Osborne and Mendel, and led them to adopt this animal for their work. The bulletin referred to above was their first complete presentment of their methodology with these animals, and with the book referred to above, constitutes one of the *sine qua non's* of the modern experimenter.[2]

The adaptation of Osborne and Mendel's rat-feeding experiments to vitamine testing followed from various influences. In the first place, they found in their experiments that animals fed on a purified diet, of the sort given on the next page, failed to grow or even to maintain weight, but declined and died.

We now know that this diet is practically a vitamine-free diet, and that it may be used as such if we take care that it is entirely freed of contaminations. The authors later showed that roughage is apparently unnecessary in rat-feeding, and that the agar may be omitted in experimentation.

Further experiments, with this inadequate diet, showed that when the nutrients and salts were supplied by milk, growth

[2] In the long series of studies of rat-feeding, carried on by Osborne and Mendel, Miss Edna Ferry devoted much time to the technical details of the work. She had prepared a monograph on their methods which was nearly ready for publication when she died. The paper was completed and published after her death by Drs. Osborne and Mendel in the *Journal of Laboratory and Clinical Medicine*, August, 1920, Vol. V, No. 11, pp. 1–12. Students are especially recommended to consult this for descriptions of cages, record taking, etc.

OSBORNE AND MENDEL'S ORIGINAL
PURIFIED NUTRIENT DIET

Protein (for general use this was purified milk casein)	18 per cent
Carbohydrate in the form of Starch	29.5
Sucrose	15
Fat in the form of lard	30
Agar-agar for roughage	5
A mixture of salts (Salt mixture 1)	2.5
Total	100

SALT MIXTURE 1
(after Röhmann)

Ca_3PO_4	10.0 gms.
K_2HPO_4	37.0
NaCl	20.0
Na citrate	15.0
Mg citrate	8.0
Ca lactate	8.0
Fe citrate	2.0
	100

became normal. This observation not only led later to the discovery of the "A" vitamine in butter-fat and the "B" vitamine in the fat-free milk, but also made a definite contribution to the composition of experimental diets by the substitution of what the authors called "protein-free milk" for the salt mixture.

This was prepared as follows:

Fresh contrifugated milk, nearly fat-free is precipitated in lots of about 36 liters by diluting with seven liters of distilled water containing 164 cc of concentrated hydrochloric acid. The casein is filtered off, through cheese cloth, and the nearly-clear solution then filtered through a pulp filter. The filtrate is then heated to boiling for a few moments and filtered through paper. This filtrate is then neutralised to litmus with sodium hydroxide and evaporated to dryness on a steam bath at a temperature of about 70° C. (158°F.). The resulting friable mass is then ground to a powder.

Analysis showed that this mixture was nearly protein-free (0.48 per cent protein) and consisted mainly of lactose and 14.5 per cent inorganic ash. A basal diet made up of this product and supplemented by butter-fat was later shown to be adequate for growth. At the time, the authors carefully analysed the salts and found that they consisted of elements that could be duplicated by the mixture given on the next page.

This artificial protein-free milk, however, was no more effective alone than was the salt mixture 1, due to the fact that the original protein-free milk carried the "B" vitamine.

OSBORNE AND MENDEL'S ARTIFICIAL PROTEIN-FREE MILK

$CaCO_3$	134.8 gms.
$MgCO_3$	24.2
Na_2CO_3	34.2
K_2CO_3	141.3
H_3PO_4	103.2
HCl	53.4
H_2SO_4	9.2
Citric acid; H_2O	111.1
Fe citrate: $1\frac{1}{2}H_2O$	63.4
KI	.020
$MnSO_4$	.079
NaF	.248
$K_2Al_2(SO_4)_3$	.245

Plus 246 gms. of lactose.[3]

These ingredients are mixed as follows: Making proper allowance for water in the chemicals, the acids are first mixed and the carbonates and citrates added. The traces of KI, $MNSO_4$, NaF and $K_2Al_2(SO_4)_2$ are then added as solutions of known concentration. The mixture is then evaporated to dryness in a current of air at 90–100° C. (212° F.) and the residue ground to a fine powder.

Without going further into the details of Osborne and Mendel's methods and experiments, it will be obvious that the data already given supply us with the materials necessary to construct:

1. A vitamine-free diet.
2. A diet containing the "A" type and free of the "B."
3. A diet containing the "B" type and free of the "A."
4. A diet adequate in both "A" and "B" types.
5. Diets adequate in every respect (calorie value, kinds of nutrients, quality of protein, salts, digestibility and palatability for rats).

[3] When the per cent of artificial protein-free milk is given in diets, the above preparation minus the lactose is understood.

[4] Meat residue is prepared as follows: Fresh lean round of beef is run through the meat chopper, ground to a paste in a Nixtamal mill, stirred into twice its weight of water, and boiled for a few minutes. The mixture is then strained through cheese cloth, the residue pressed in the hydraulic press, and the pressed cake stirred into a large quantity of boiling water. After repeating this process of washing with hot water, the extracted residue is dried rapidly in a current of warm air at about 60 degrees Centigrade. This gives a protein material free of vitamine.

[5] The butter-fat is prepared as follows: Butter is melted in a flask in a water bath at 45 degrees Centigrade (113 degrees Fahrenheit), and then centrifugated for one hour at high speed. This results in a separation of the mixture into three layers:

a. Clear fat containing the "A" vitamine and 82–83 per cent of glycerides. This, separated off, is the butter-fat of the basal diets.

b. An aqueous opalescent layer consisting of water and some of the water-soluble constituents of milk. Rejected.

c. A white solid mass consisting of cells, bacteria, calcium phosphate, and casein particles. Rejected.

[6] It is Mendel's practice to feed this source of the "B" vitamine separately to insure sufficient consumption to affect the appetite.

The combinations that have been used by Osborne and Mendel in various experiments may be summarized as follows:

OSBORNE AND MENDEL'S BASAL DIETS

Figures give the percentages of each substance in a given weight of the diet. Each column, A, B, C, etc., represents a different diet.

Substances used	Vitamine-free diets			Diets containing "A" only					Diets containing "B" only				
	A	B	C	A	B	C	D	E	A	B	C	D	E
Purified proteins in the form of Casein, Lactalbumen, Edestin, Egg albumen, etc.	18	18		18	18		18	18	18	18		18	18
Meat residue[4]			19.6			19.6					19.6		
Carbohydrates in the form of													26-
Starch or	29.5	48	52.4	29.5	48	52.4	45	45	29.5	48	52.4	47	29
Sucrose	15			15					15				
Fats in the form of													25-
Lard or	30	30	24	15	21	15	15	27	30	30	24	31	28
Butter-fat[5] or				15	9	9							
Egg-yolk fat or							18	6					
Cod-liver oil													
Salts in the form of													
Salt mixture 1	2.5			2.5					2.5				
Protein - free milk													28
Artificial protein free milk		4	4		4	4	4	4		4	4	4	
Roughage in the form of													
Agar-Agar	5			5					5				
"B" vitamine in the form of									.2-.6 gms. daily	.4 gms. daily	.2-.6 gms. daily	.4 gms. daily	
Dried brewers' yeast[6]													
Totals	100	100	100	100	100	100	100	100	100	100			100

For foot-notes see page 154.

These basal diets have been criticised, from time to time, for various reasons; for example, rats often grow for a considerable time on a diet free of the "A" vitamine. In a recent article, Daniels and Loughlin have claimed that lard (supposedly "A" vitamine-free) may contain enough to permit rats to grow, reproduce, and rear young. The British authorities explain this phenomenon as not due to the presence of the "A" vitamine in the lard, but to a reserve store in the bodies of such animals. Osborne and Mendel have recently re-investigated this whole subject. They have purified their basal diets as follows: Protein given in the form of casein or edestin is boiled three successive times, (for an hour each time) with absolute alcohol under a reflux condenser and filtered-off by suction. This is held to remove all trace of the "A" vitamine and does not, according to Mendel, interfere with the nutritive value of the protein.

Commercial cornstarch is purified in the same way.

Brewers' yeast is used as the source of the vitamine "B," and is first dried over night in the electric oven at 110°C., and then extracted in the same way as the protein and starch.

The lard is purified by melting and pouring into absolute alcohol, heated to 60°C. (140°F.), cooled over night and filtered by suction. This is repeated three times and the resulting solids dried in a casserole over a steam bath. Their results, however, do not indicate any vitamine in the commercial lard, since this purified lard yields no different result in their experiments from the commercial lard. Their proportions of these purified products were: Casein or edestin 18%; Starch 48%; Salt mixture as Artificial protein-free milk 4%; Lard 30%; plus 0.4 gms dried yeast, fed separately, daily.

3. Before discussing the detailed methodology of applying these basal diets, let us turn for a moment to the contributions made by McCollum. The latter has given especial attention to the dietary deficiencies in cereals, not only as regards their vitamine lack, but their general dietary deficiencies. Hence, his basal diets give us combinations especially suitable for the study of these foodstuffs. His most generally used salt mixture is one that he has numbered 185. Its composition is given on page 157.

When this is used, iodine is supplied, from time to time, as dissolved iodide in the drinking water.

McCollum Salt Mixture No. 185

NaCl	.173 gms.
$MgSO_4$anhydr	.266
$Na_2HPO_4:H_2O$	.347
K_2HPO_4	.954
$CaH_4(PO_4)_2:H_2O$	.540
Ca lactate	1.300
Ferrous lactate	.118

The following table gives McCollum's Salt Mixtures:

McCollum's Salt Mixtures

Salt Mixture No.	185[7]	314[8]	318[9]	500[10]	211[11]	*a*[12]	*b*[12]	*c*[12]	*x*[13]	*y*[13]
NaCl	.173	1.067	1.400	.5148	.520	3.430	.61		12.31	15.00
$MgSO_4$anhydr	.266								1.56	1.90
$Na_2HPO_4:H_2O$	.347									
K_2HPO_4	.954	3.016	2.531	.3113		3.648	17.00		28.08	34.22
$CaH_4(PO_4)_2:H_2O$	.540				.276		1.63	1.880		.89
Ca lactate	1.300	5.553	7.058	2.8780	1.971	3.785	11.38	25.377	46.80	57.02
Ferrous lactate	.118								1.64	
K citrate:H_2O		.203	.710	.5562	.799	3.1180				
Na citrate anhydr								2.866	3.12	3.70
Ferric citrate		.100				1.000	1.00			2.00
Mg. citrate						1.2980	23.42		5.75	7.00
Ca Cl_2		.386		.2569				anhydr		
$CaSO_4:2H_2O$		.381	.578					.168		
Na_2HPO_4 anhydr						3.2960		5.052		
Fe acetate					.100					

[7] No. 185 is the one most generally used in making up a diet of purified nutrients. It is especially fitted to supplement corn mixtures.

[8] No. 314 was used in guinea pig diets.

[9] No. 318 is devised to supplement wheat mixtures.

[10] No. 500 is devised to supplement oat mixtures.

[11] No. 211 was used (*Journal of Biological Chemistry*, XXVII, p. 33).

[12] Mixtures *a*, *b*, and *c* were modifications used in 1913 to study the relation of fat to the vitamine activity (*Journal of Biological Chemistry*, XV, 167).

[13] Mixtures *x* and *y* are approximately the salt-content of skim milk.

McCollum also prefers to give his carbohydrate as dextrin for several reasons. One is that he has devised a means of extracting the "B" vitamine from foods and depositing it on dextrin so that the latter may be made the carrier of the "B" in a test as well as the source of the carbohydrate. His method consists of first extracting the source of the "B" with ether and discarding the filtrate; then, re-extracting the residue under a reflux condenser several times, (6 hours at a time), with 95 per cent alcohol. The alcohol-extract carries "B" vitamine, and by evaporating it on dextrin the latter may be made to carry the vitamine of a weighed amount of the source.

In some of his earlier studies, McCollum used lactose as his pure carbohydrate, but this was later shown to be usually contaminated by an appreciable amount of the "B" vitamine.

McCollum's basal diets fall into two classes; first, those used in testing deficiencies in cereals; and second, those used for measuring the vitamine-content of foodstuffs in general. The former contain, as a rule, a combination of one of these cereals with the proper salts, carbohydrates, etc., and by introducing the vitamine he was able to measure the cereal's deficiencies in this respect. An example will make this clear.

BASAL DIET FOR THE STUDY OF WHEAT

Wheat	56.6 per cent
Salt mixture 318	6.9
Butter-fat	5.0
Dextrin	31.5

Such a diet carries the "A" vitamine in the butter-fat, and the results would tell whether the wheat was adequate or inadequate in the "B" vitamine. If found to be inadequate, he could then load his dextrin with varying amounts of extracted vitamine, as described above, and thus get his limits in terms of a given source x. Such experiments, obviously, give an answer in terms of how much of a given source of the "B" vitamine must be given to supplement a wheat diet. By omitting butter-fat from such a basal diet, and supplying an adequate amount of "B" he could determine the same facts regarding the "A" vitamine deficiencies of wheat.

The following are some of his other mixtures devised for this purpose:

McCollum's Cereal-Testing Combinations

Figures give per cents of total weight used. Each column A, B, C, etc., represents a different diet.

SUBSTANCES	A	B	C	D	E	F
Wheat	56.6					70.
Wheat embryo		13.3				
Corn				71.3		
Oats					60.	
Skim milk powder			6.			
Dextrin	31.5	76.4	81.	18.	30.3	20.
Agar			2.	2.		
Salt mixture No. 185				3.7		
Salt mixture No. 314		5.3				
Salt mixture No. 318	6.9					5.0
Salt mixture No. 500					4.7	
Butter-fat	5.0	5.0	5.0	5.0	5.0	5.0
Salt mixture y			6.0			
Totals	100.0	100.0	100.0	100.0	100.0	100.0

The combinations used by McCollum to test for the presence of a vitamine follow:

	Vitamine-Free				"A" Vitamine Only	"B" Vitamine Only
	A	B	C	D		
Casein	18.	18.	18.	18.	18.	Same as the Vitamine-free with the "B" added, as yeast, or as extracts carried by the dextrin.
Dextrin	57.3	56.3	76.3	78.3	71.3	
Lactose [14]	20.0	20.0	...	...	...	
Agar	2.0	2.0	2.0	...	2.0	
Salt Mixture No. 185	2.7	3.7	3.7	3.7	3.7	
Butter-fat	...	...	...	...	5.0	
Totals	100%	100%	100%	100%	100%	100%

[14] Later shown to be usually contaminated with the "B" vitamine.

4. Another author who has contributed to the study of vitamine-content is Steenbock. He has made a special study of the sources of the "Fat-soluble A." Steenbock's basal diets are as follows:

STEENBOCK'S ORIGINAL MIXTURE

Casein washed with water containing acetic acid	18 per cent
Agar	2
Ether-extracted wheat embryo as source of vitamine "B"	3
Salt mixture (McCollum's No. 185)	3.7
Dextrin	73.3

The unknown substance which he wished to test is then substituted for a portion of the dextrin, gram for gram; e.g., if he uses 5 per cent butter-fat, the dextrin 73.3 per cent is reduced to 68.3 per cent, other ingredients being retained in the per cents given.

In his later mixtures he used the following combinations: "B" vitamine supplied as an alcohol-extract of 20 grams of wheat embryo deposited upon the dextrin. "A" vitamine is supplied by the unknown, its per cent being subtracted from the dextrin; butter-fat is used as the source of the "A" for control-purposes. The dextrin is prepared by heating cornstarch with 0.1 per cent citric acid solution in an autoclave for a number of hours and then drying and grinding it.

The casein is repeatedly washed for a week with distilled water acidified with acetic acid, dried and pulverized.

For a salt mixture, he uses either the No. 185 of McCollum, or Salt mixture No. 32, and for special studies combines this with a Salt mixture No. 35. These Salt mixtures are given on page 161.

5. It is almost unnecessary at this point to describe the procedure with these basal diets, for their composition suggests their use. In general, this use is based on the following principles:

a. To meet the requirements of a food complete in every particular except the one being tested. These requirements may be briefly recapitulated as follows:

(1) Foods must supply the proper number of heat-units, or calories. By supplying ample carbohydrate and fat, and by permitting the animals to eat all they wish, this requirement is met.

STEENBOCK'S SALT MIXTURES

Salt Mixture	No. 185 McCollums's	No. 32	No. 35
NaCl	.173 gms.	.202 gms.	1.00 gms.
$MgSO_4$ anhydr.	.266	.311	
$Na_2HPO_4:H_2O$	.347		
K_2HPO_4	.954	1.115	
$CaH_4(PO_4)_2H_2O$	.540		
Ca lactate	1.300	.289	
Ferrous lactate	.118		
$Na_2HPO_4:12H_2O$		.526	
$Ca_3H_2(PO_4)_2H_2O$		1.116	
Fe citrate		.138	
$CaCo_3$			1.5

SAMPLE BASAL DIETS FOR STUDY OF "A" CONTENT (STEENBOCK)

Each column represents a different diet.

Casein	18.	18.	16.	18.	16.	12.
Salts	(No. 185)	(No. 185)	(No. 32)	(No. 32)	(No. 32)	(No. 32)
	4.	4.	4.	4.	+	+
					(No. 35)	(No. 35)
					2 + 2.5	2 + 2.5
Agar	2.	2.	2.	1.		
Dextrin X [15]	76.	71.	78.	57.		
Butter-fat		5.		5.		
Beets				15.		
Potatoes					79.5	
Daskheens						83.5
Total	100	100	100	100	100	100

(2) Proper proportions of protein, fat, carbohydrates and salts. The percentages given in the basal diets have been worked out on this basis.

(3) Proper protein quality. This means that not all proteins are of equal value. The ones given in the basal diets are selected to meet these requirements. Casein and lactalbumin are especially fitted for use in this particular.

(4) Palatability. The animals must like the mixture.

(5) Digestibility. Purified nutrients are obviously digestible.

[15] Usually the alcohol-extract of 20 gms. wheat embryo deposited on the dextrin. The activation of the dextrin is indicated by the "X."

(6) Proper amounts of the "A" and "B" vitamine if we are to get growth. "C" may also be necessary but need not necessarily be considered in tests for "A" and "B". In these experiments the latter are the unknowns, and it is merely necessary to be sure that enough of "A" is present when we test for "B," and of "B" when we test for "A," etc.

b. Continuation of the experiment through a complete generation, growth, reproduction and rearing of young for determination of complete adequacy in any given vitamine. Experience has shown that often a substance may produce normal growth but be inadequate for reproduction or for rearing of young after birth. The nature of the problem, of course, affects this feature.

c. A sufficient number of similar animals to rule out individual variations in the conclusions. In the use of rats, for example, it is better to base comparisons on rats from the same litter, if possible.

d. Animals must be kept under hygienic conditions, never allowed to be without food and water, and account must be taken of all food consumed and scattered. The sample laboratory record on the following page will illustrate the method without further description.

For control purposes, it is necessary to have diets shown to be perfectly adequate to secure normal growth. The diets, already given, would enable one to compute such a combination. Sherman gives the following as of tested value in his laboratory:

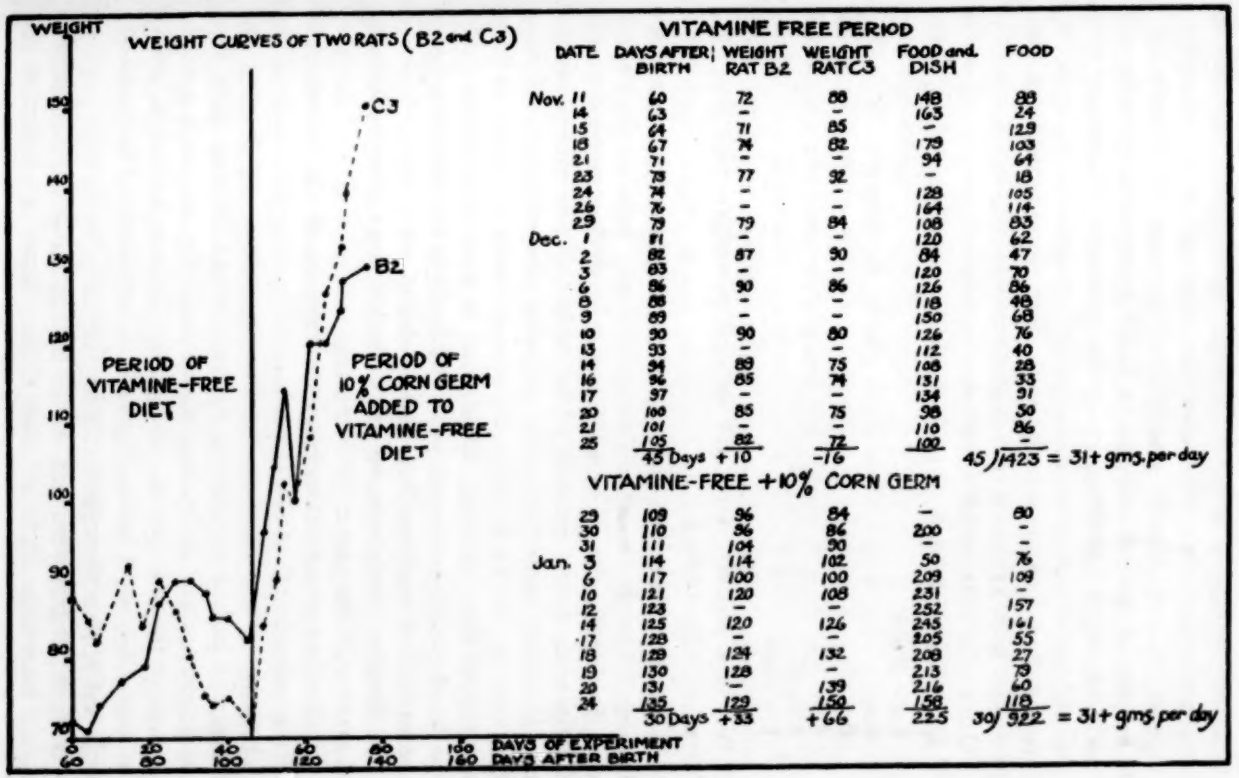
⅓ by weight of whole milk powder.

⅔ by weight of ground whole wheat. Add to the mixture an amount of NaCl equal to 2 per cent of the weight of the wheat.

This has been proved by him adequate to carry rats to the fifth generation.

Mendel uses, as a complete diet for the same purpose, the following mixtures, in which the numbers indicate percentages.

Meat residue	19.6		
Casein		18.	
Lact albumen			18.
Artificial protein-free milk	4.	4.	4.
Starch	52.4	49.	47.
Lard	15.	20.	22.
Butter-fat	9.	9.	9.
Dried yeast	0.2-0.6 gms. (daily)	.4 gms. (daily)	.4 gms. (daily)



VITAMINE FREE PERIOD

DATE	DAYS AFTER BIRTH	WEIGHT RAT B2	WEIGHT RAT C3	FOOD and DISH	FOOD
Nov. 11	60	72	88	148	88
14	63	-	-	163	24
15	64	71	85	-	129
18	67	74	82	179	103
21	71	-	-	94	64
23	73	77	92	-	18
24	74	-	-	128	105
26	76	-	-	164	114
29	79	79	84	108	83
Dec. 1	81	-	-	120	62
2	82	87	90	84	47
3	83	-	-	120	70
6	86	90	86	126	86
8	88	-	-	118	48
9	89	-	-	150	68
10	90	90	80	126	76
13	93	-	-	112	40
14	94	89	75	108	28
16	96	85	74	131	33
17	97	-	-	134	91
20	100	85	75	98	50
21	101	-	-	110	86
25	105	82	72	100	-
	45 Days	+10	-16		45)1423 = 31+ gms. per day

VITAMINE-FREE +10% CORN GERM

29	109	96	84	-	80
30	110	96	86	200	-
31	111	104	90	-	-
Jan. 3	114	114	102	50	76
6	117	100	100	209	109
10	121	120	108	231	-
12	123	-	-	252	157
14	125	120	126	245	141
17	128	-	-	205	55
18	129	124	132	208	27
19	130	128	-	213	79
20	131	-	139	216	60
24	135	129	150	158	118
	30 Days	+33	+66	225	30)522 = 31+ gms. per day

SAMPLE LABORATORY RECORD

Mendel believes it better to give the "B" vitamine separately; i. e., not mixed with the basal diet, because of its effect on appetite. It was Mendel who first laid stress on the importance of keeping records of food intake in all experiments in order to check the question of adequacy in the amount of food eaten.

Other mixtures have been used by other students; but most of these are based on the ones already given, modified only in the particular which pertains to a special experiment.

One of the diets used by Funk was as follows:

Casein	22 per cent
Sugar (cane)	10
Starch	27–33
Butter	30
Agar	2
Mendel's Artificial protein-free milk	3
Dry yeast	2–6

We have already noted the general procedure with the unknowns; this involves:

a. Feeding a weighed quantity of the dried material (practice having shown that materials are more easily handled dry) and, with foodstuffs, this is brought about by drying at 60 degrees Centigrade. If the amount added to the diet is small enough not to affect appreciably the optimum concentrations of the nutrients in the basal diets, no account need be taken of the analysis of the unknown. Otherwise, it must be analysed and the basal diet so corrected as to still provide the optimum concentrations of proteins, fats, carbohydrates, salts, etc.

b. Feeding a weighed quantity of the unknown after treatment to destroy all but one of the vitamines.

c. Feeding an extract carrying the vitamine of a given amount of the source.

If our method involves (*a*) the procedures are usually as follows: Gradual increase or decrease in the amount until the animals do as well on it as on the control. Or, we retain a fixed amount of the unknown in the diet and supplement it with yeast or butter-fat until normal growth is attained. Comparisons yield the approximate quantitative comparisons desired.

The methods considered in (*b*) and (*c*) obviously demand special knowledge of the behavior of the vitamines. It used to be

thought that ether extraction, in removing all the fat, would free a substance of the "A" type, and that the residue from the ether extract would contain the "A" vitamine. This no longer holds. In a recent paper Mendel calls attention to the fact that ether-alcohol is often efficient where ether alone fails, and that ether will often extract the "A" if the product has been previously extracted with alcohol. This suggests the idea that the "A" may be in a complex that must be broken by alcohol, or other agents, before it will pass into the ether extract. He has also found that the "A" in butter-fat can be removed by crystallizing the fat from absolute alcohol.

The "B" vitamine is usually held to be destroyed by alkali combined with heating; but the efficiency of the means for its destruction and removal is much less certain than in the case of the "A." It is soluble in water, and in 95 per cent alcohol, and less so in absolute alcohol. The two former reagents are usually used as extractants.

Atherton Seidell, a few years ago, discovered that the "B" vitamine could be absorbed from a watery extract, almost quantitatively, by shaking that extract with a special form of Fuller's earth marketed as Lloyd's reagent and that this activated-earth would yield its vitamine when fed. This method has since come into considerable use as a means of testing both extracts and sources.

The author of this paper used this method in 1915, to demonstrate the presence of the "B" vitamine in sheep pancreas. A watery extract of the pancreas was obtained and shaken with Lloyd's reagent. The filtered-off activated reagent was dried, weighed, and known amounts added to a vitamine-free basal diet. The results indicated both the presence of the vitamine in the pancreas and a rough idea of the amount. During the past years, Dr. Ralph McKee, of the department of chemical engineering in Columbia University, has supplied the author with some specially prepared carbon or bone-black which seems to have a similar absorbent power.

6. In what has preceded we have mainly discussed the methods for hunting the "A" and "B" types. What of "C"? The "C" vitamine is extremely sensitive to heat and consequently, heating may be utilized to render a basal diet free of this vitamine. It is

also destroyed by alkali. La Mer, in Sherman's laboratory, has during the past year paid special attention to this matter of feeding guinea pigs to produce scurvy and has supplied me with the following diet and procedure for scurvy studies.

First, select guinea pigs of about 350 grams weight and test them with the basal diet until you get a set that will eat it. Guinea pigs will readily die of starvation rather than eat a perfectly adequate food which they do not like. Having secured a set that will eat the diet, they should develop scurvy on it in about 27 days. Sherman's diet is as follows:

Skim milk powder (heated 2 hours at 110°Centigrade in an air bath to destroy any traces of the "C" vitamine left)	30 per cent
Butter-fat	10
Ground whole oats	59
NaCl	1

Old food should be removed and replaced by new every two days, cleaning cups at the same time.

La Mer and Sherman have recently published an article bearing on the relation of hydrogen ion concentration to the destruction of this vitamine.

Since this diet produces scurvy, its use in testing is obvious. You may first produce scurvy with the diet, then add the unknown and see if the animals recover, as in the polyneuritic pigeon tests for beri-beri. Or, you may introduce the unknown into the basal diet and note whether it prevents the animals from getting scurvy.

There are other diets that have been used for this purpose and, obviously, any diet that lacks the "C" vitamine will produce the disease. Thus, Holst and Fröhlich induced scurvy by restricting animals to an exclusive cereal diet (oats or rye or barley or maize or oat bran). Hess and Unger use hay, oats, and water given ad libitum to induce scurvy. All of these and others are liable to criticism on the basis that they are not necessarily adequate in other food factors, but the above diet from Sherman meets this criticism. McCollum was misled in his earlier experiments with an ad libitum diet because the pigs were allowed to drink milk freely, and no account taken of the amounts consumed.

7. Another disease that seems to be due to dietary deficiency

is rickets, though the exact cause is as yet unknown. In the January, 1921, number of the *Journal of Biological Chemistry*, McCollum submits the following as diets proven to produce rickets, though he declines to state what is the dietary factor or factors individually responsible. These diets, however, are of interest as supplying methodology for the study of an anti-rachitic vitamine, if such exists:

DIETS WHICH, ACCORDING TO MCCOLLUM, PRODUCE RICKETS AND THEIR PECULIAR DEFICIENCIES

Figures give the per cents of the ingredients. Each column, A, B, C, etc., represents a different diet.

SUBSTANCES USED	A	B	C	D	E	F	G	H	I	J	K
Whole wheat kernel	30.			30.	30.	30.			28.		
Maize kernel	20.			30.	19.5	14.5			20.		
Polished rice	12.			10.	9.5	9.5	12.		9.5		11.
Rolled oats (whole seed)	11.5		49.2	10.	8.5	9.5	11.5	40.	9.5		11.5
Peas (whole seed)	12.			10.	8.5	9.5	12.		9.5		11.0
Navy beans (whole seed)	12.			10.	8.5	9.5	12.		9.5		11.0
$NaHCO_3$	1.5				1.5		1.5				1.5
NaCl	1.0	1.0	1.0		1.0	1.0			1.0	1.0	1.0
Beef liver steamed and dried		20.									
Casein		10.								10.	
KCl		1.0								1.0	
Dextrine		65.	49.2			1.5	1.0	46.3		66.	
Butter-fat		3.				5.					3.
Flaxseed oil meal			8.3								
$CaCo_3$			1.5						3.		
Cod-liver oil					3.					2.	
Round steak					10.	10.			10.		
Bolted flour							30.				
Corn meal							20.				
Gelatin								10.			
Salt mixture No. 185								3.7			
Liver										20.	
Wheat whole seeds											30.
Corn whole seeds											20.

A. Lacks vitamine "A" and calcium.
B. Lacks calcium and acidity.
C. Lacks vitamine "A." Good results when butter-fat is added.
D. Lacks Ca, Na, Ce, "A" vitamine and is acid.
E. Good growth but poor skeletons, females often die in giving birth to young.
F. Lacks Ca but supplemented by 1.5% $CaCO_3$ yields good bones.
G. Lacks Ca, "A" and protein in the order of their importance.
H. Lacks "A."
I. Lacks "A" and Ca but 2% cod-liver oil added produces normal development.
J. Lacks Ca.
K. Lacks Ca but 1.5 $CaCO_3$ added gives fairly good results.

There is no question but that cod-liver oil is an important preventive of rickets, but whether due to its "A" vitamine or not is uncertain. It is also still uncertain what are the causes of rickets. All of the tests so far described have one great fault from the chemist's view-point. They are great time consumers. The ideal test needed is one that shall be like tests for lead, for proteins, etc., immediate and specific in its reactions, and quantitative. At present, the chemist who tries to fraction a product to seek the vitamine must wait a long time while his fractions are being tested by the methods outlined before he makes his next step. Early in his studies, Funk showed that the "B" vitamine, at least, gave the uric acid reagent (Folin and Macallum's) reaction, but too many things beside vitamine respond to this test to make it of much value.

A little over a year ago, Roger Williams proposed a test based on the idea that yeast cells will not grow without the "B" vitamine. Long before Williams, and before vitamines were named, Wildier, in France, commented on the fact that yeast cells, introduced into a mineral salt culture medium, would not grow there unless something was present which was supplied by dead and autolysed yeast cells, extracts of grasses, etc., and which he called "bios." Is "bios" water-soluble B, and can this behavior of yeast be utilized to test quantitatively for the vitamine? Williams experimented with this idea and not only developed a method but showed that substances rich in "B" vitamine responded to the test. This work has been under active investigation ever since Williams's paper appeared. The author of this article, with the assistance of Miss Helen Stevenson and other Teachers College students, has been actively engaged in work on this test for a little over a year. We have investigated all the methods proposed to date and presented one of our own; but it is not yet established that this test is either specific for the "B" vitamine or quantitatively efficient, and its discussion is, therefore, reserved for a later presentation.

The details of the care and feeding of animals are not included in this paper. The references given, however, will enable the student to secure these data before beginning work, and our purpose is accomplished if the basal principles of vitamine-testing are clear.

COLLEGE NEWS AND DEPARTMENTAL NOTES

EDUCATIONAL ADMINISTRATION

Dr. George D. Strayer, as chairman of the legislative commission of the National Education Association, has brought about the organization of a national Laymen's Committee for a Department of Education. Many prominent men throughout the country have already expressed their willingness to become members of this committee.

Professor N. L. Engelhardt has been recently assisting in the development of school building programs for Port Clinton, Kent, Oberlin, and Sandusky, Ohio.

Professor Edward S. Evenden, at the invitation of the salary committee of the teachers' council of Roanoke, Virginia, recently addressed a mass meeting of residents of that city on the subject of teachers' salaries.

Professor Strayer, who is on leave of absence during the spring session, is spending a large part of his time in Baltimore directing the work of the survey which is being made there. In coöperation with the Public School Association and other organized groups, he is conducting a campaign of publicity aimed to enlist the support of the city for the program of development proposed as a result of the survey.

The Bureau of Publications has issued a pamphlet describing the publications in the Teachers College School Building Series. The series includes the following which have been prepared by Professors Strayer and Engelhardt:

A School Building Program for Cities
Score Card for City School Buildings
Bulletin of Standards for City School Buildings
Score Card for Village or Rural School Buildings
Bulletin of Standards for Village or Rural School Buildings
Score Card for High School Buildings (In preparation)
Bulletin of Standards for High School Buildings (In preparation)

George W. Frasier, associate in the department of educational administration, is making a study of the relationships between boards of education and other municipal officers and bodies. He has compiled all charter regulations, state laws, and other legal provisions which define how money is raised for the schools in all American cities of more than 250,000 population. These cities and about three hundred smaller ones which will be added to the list are being classified according to various degrees of fiscal independence. Mr. Frasier is developing an index of efficiency to serve as an aid in determining which type of fiscal relationship produces the best results.

Professor Strayer is being called upon by teachers' organizations and by groups of laymen throughout the country to speak in support of the Smith-Towner Bill. He has recently appeared before the State Teachers' Association of Ohio, the Women's National Civic Federation in New York City, the Milford Forum, Milford, Connecticut, the Commonweal Club, Syracuse, N. Y., the Women's Club of Johns Hopkins University, and before groups of teachers and laymen in Port Clinton, Elyria, Springfield, Dayton, and Fremont, Ohio.

At the Teachers College Alumni meeting the section of administration and college teachers of education will base its program on the general topic, "Increased Support for American Public Schools." The chairman will be Mr. Ernest W. Fellows, superintendent of schools, Framingham, Massachusetts. The following problems will be discussed: (1) Is increased support necessary? (2) Can we afford to spend more money? (3) What program of taxation is necessary to secure the revenue needed?

Dr. G. M. Neale's study, "School Reports as a Means for Securing Additional Support for Education in American Cities" has just been issued by the press of the Missouri Book Company, of Columbia, Missouri. The study is based on the publicity of two hundred forty-two American city school systems. The following topics are discussed: (1) Types of publicity now in use, (2) the extent of the distribution of this publicity, (3) the audiences for whom this publicity is intended, (4) the types of publicity best fitted for teaching the general public, (5) the cost of publicity. The study concludes with recommendations for a publicity program for American city school systems.

EDUCATIONAL PSYCHOLOGY

Professor Edward L. Thorndike has been invited to deliver a series of lectures at the summer session of the Colorado State Teachers College, July 11 to 21. Professor H. A. Ruger will lecture at the summer session of the University of Nebraska, during June. Professor Whitley has returned from her sabbatical half-year in Europe.

The additional space made available by the building of the annex provides the department of educational psychology in Teachers College with laboratory space, which will be much appreciated by the staff and students, and which should notably increase the efficiency of the work in the application of experimental psychology and individual psychology to the theory and practice of teaching.

The following quotation from the annual report of Dean Herbert E. Hawkes, of Columbia College, will be of interest to Teachers College alumni who are following the recent developments in the use of intelligence tests in colleges and normal schools.

"Fortunately," says the dean in summing up the merits of the new plan of admission, "it is possible to determine with scientific accuracy whether or not the mental test is a useful addition to our academic machinery. If it turns out, during a series of years, that the correlation between the marks received on the mental test and the collegiate work of the students is distinctly higher than the correlation between the results of other types of entrance examinations and the college work, it would seem to be clear that the new plan of admission affords the best index that we have of the ability of a boy to carry on college work.

"The most reliable data available indicate that the highest correlation that can be expected between the work of the freshman year and the results of the usual college entrance examinations is about .45. This latter figure has been obtained not only from a statistical study of our own freshmen but from similar studies in other institutions.

"Although it is too early to make a final statement regarding the matter, every indication points to the mental test as a most useful addition to our machinery of admission."

ELEMENTARY EDUCATION

Professor Annie E. Moore has completed her report on "Typical Daily Programs in Primary Grades," the result of studies conducted by a committee of the National Primary Council, of which she was chairman for two years. The report is published in full by the National Primary Council.

The Elementary Club, which now has a large and active membership, is accomplishing the very important function of bringing the students and staff of the department into closer social relationship. During the first semester four meetings were held; a "stunt party," a picnic, a Hallowe'en party, and, on December 13, a discussion of the use of motion pictures in schools. In the course of this discussion the principle was very clearly brought out that any school system that aims to make the most effective use of educational films must assemble its own library of films, rather than depend upon the rental of reels.

ECONOMIC SCIENCE

A coöperative household research group, composed of household arts graduates of Teachers College, who are now married and keeping house, was organized by Professor Benjamin R. Andrews, in connection with the department of home economics, January 21, and will hold monthly meetings during the spring session. The purpose of the group is to study the business problems of the home under the leadership of the department with a view to collecting data on household problems. The group will organize a meeting Alumni Week for all married alumnae who desire to join in a discussion conference.

Professor Andrews spent several days at Berea College, Kentucky, between the winter and spring sessions, appraising the work of the home science departments of the college and its four associated schools. A particular problem that engaged his attention was the system of "country homes" on the campus of the institution, consisting of five practice houses in which the students live for twelve weeks, carrying on the practice housekeeping as in the usual practice house, and receiving at the same time a course of related instruction on the house and its

equipment, the various housekeeping processes, and also the personal life of the home.

Students of the course in principles of economics arranged an exhibit on Women and Industry during the week of January 5 to 12. It consisted of large colored panels, secured from the United States Department of Labor, illustrating various problems in this field, such as, "Is a Job Less Because a Woman Does It," "Fire Danger," "Health, Care, Comfort," "The Dress and the Job," and "New Jobs for Women." The panels made a very graphic presentation of the existing conditions which women workers are meeting in industry and what efforts are being made to improve them. Following the exhibit, there was shown in the Horace Mann Auditorium a motion picture entitled "When Women Work" which was borrowed from the women's division of the United States Department of Labor. Both the exhibit material and the film are available for loan to educational institutions.

HOUSEHOLD ARTS EDUCATION

Professor Anna M. Cooley addressed a conference on home economics at Russell Sage College on February 11 and 12.

Miss Frances Zuill, instructor in the department of household arts education, has been appointed supervisor of home economics for the city of Baltimore, and began her work there about February 1.

Miss Ailsie M. Stevenson has been appointed assistant in the department to fill out the unexpired term of Miss Zuill.

The students of the household arts education and nutrition departments, who have been working at the Morningside Nutrition and Home-making Center gave a very successful Christmas party to two hundred and twenty-five children.

The graduate and senior students in the department, in coöperation with Miss Elizabeth Woodward, New York supervisor of classes for immigrant women, have prepared leaflets and posters on food, clothing, and sanitation subjects, to be used in Americanization classes for non-English-speaking women in New York City.

HOUSEHOLD AND INSTITUTION ADMINISTRATION

The department has offered a new course this year in practical work in institutional administration, under the direction of Miss Katharine A. Fisher. This course is given so that students majoring in institutional administration may gain a practical knowledge of conditions in the field, develop some ability in meeting the needs of specific situations, and so supplement their work in the classroom and laboratory. This practice work is given in the various college lunch rooms, through the generous coöperation of Miss Emma R. Baker and her staff. It is carefully supervised. The students are required to devote approximately twenty hours a week to the course, and to present written reports. Six points of credit are given.

The new course represents a very necessary part of any training in the problems of the administration of food service for large numbers; and it is hoped that the work, as now outlined, will be extended and developed in such a way that our students may, during their training in the department, have the opportunity of gaining a broad and a sound practical experience in the different phases of this administrative work, including housing problems as well as those of food service. It is felt that this course or its equivalent should be a prerequisite to the other courses in institutional administration, as such experience is obviously a basis for intelligent work in the classroom and laboratory. The limitations of the course should also be recognized. Owing to the inexperience of the average student and to the conditions under which the work must be given, such practice cannot develop managerial skill to any extent. It is considered, however, a necessary introduction to post-graduate work where the student, in the position of an assistant, may secure definite experience in managerial problems.

An increasing number of teaching positions in household arts now demand a knowledge of the management of large group households and of food, especially in the college dormitory and lunch room service, for large numbers. In response to this demand, colleges all over the country are organizing departments of institutional administration, and a number of the graduates of Teachers College are already at the head of such departments

in various colleges. It is a matter of major importance, therefore, that our department here develop a course that will provide an adequate opportunity for sound practical experience, in addition to arranging for other aspects of institutional training.

Professor Emma H. Gunther recently had an opportunity to visit southern colleges, including Richmond College, Richmond, Va.; Meredith College, Peace Institute, and St. Mary's College in Raleigh, N. C.; Chicora College, Columbia, S. C.; and Stetson University, Deland, Fla. She was especially interested in studying college dormitories, and finds that definite information in connection with the housing and feeding of students is a great need. She not only gave talks at several colleges, but had many conferences with Teachers College graduates.

Miss Emma R. Baker gave a talk at a recent conference in Boston on "The Problem of Feeding College Men and Women." There were about five hundred in attendance, including many representatives from the larger eastern colleges.

Miss Lydia R. Balderston has just returned from a visit to the south where she studied the development of courses in housewifery and laundering especially in sections of South Carolina, Georgia, and at Rollins College, Winter Park, Fla.

Messages have been received from graduates of the department including one from Miss Irma Hathorne, dean of women, State Normal School, River Falls, Wis., whose special interest is to develop some plan of coöperative housekeeping for a group of girls who live in small houses about the campus; from Miss Mary Goodell as supervisor of dormitories at the New Jersey College for Women, New Brunswick, N. J.; Miss Gladys Stratton about her work in rural extension in the state of Connecticut; and from Miss Marion Peterson as dietitian of the Swedish Hospital, Minneapolis.

Interesting calls have been made upon the department recently for assistance in scheduling the work and apportioning the expenses for households, which have been taken care of by Miss Anne D. Blitz. Miss Balderston has been taking up the problem of a community laundry with Greenwich Settlement House.

MATHEMATICS

Professor Smith attended the meeting of the National Committee on Mathematical Requirements in Chicago on December 29 and 30, where he presented his report on Mathematical Terms and Symbols. He read a paper before Section L of the American Association for the Advancement of Science on the First Mathematical Work Printed in the New World. In this he described the *Sumario Compendioso* of Juan Diez. This work is now in course of publication in a limited edition.

At a meeting of the mathematicians and astronomers, held in Chicago on December 28, Professor Smith read a letter written by Delambre, one of the great mathematicians of Napoleon's time, which was the cause of the release of James Smithson from the military prison at Hamburg, where he had been placed after the Napoleonic raid in Prussia. Had this letter not been written, it is possible that the Smithsonian Institution would never have been founded.

Special efforts are being put forth to make the coming summer session at Teachers College a notable one in the teaching of mathematics in this country. Since the summer session follows immediately upon the termination of the work of the National Committee on Mathematical Requirements, it is proposed to include the entire work of that committee, and to set forth in great detail the opportunities for improving the teaching of mathematics in this country as a result of that movement and of the work of the International Commission on the Teaching of Mathematics.

Professor Smith has been made one of the referees in the case of American Field Service Fellowships for French Universities.

NURSING AND HEALTH

The department is fortunate in having secured for the summer session of 1921, Dr. Donald Armstrong, executive officer of the Framingham Community Health and Tuberculosis Demonstration, to give the course in sanitary science.

Dr. Louis Harris, director of the Bureau of Preventable Diseases of the City Health Department, is giving the course in industrial hygiene during the spring session, assisted by some

experts in the field. Dr. Harris was engaged for some years in the study of occupational diseases, and was in charge of the Industrial Division of the City Health Department.

The following series of special lectures and new unit courses is arranged for the spring session. These are all professional courses, and Miss Miner's lectures are the only ones open to students in other departments of the College.

Rural Sociology in Relation to Nursing, Dr. Warren H. Wilson, Professor Mabel Carney and Dr. Fannie W. Dunn; Protective Work for Girls, Miss Maude Miner; Some Social Elements in Medicine, Dr. Michael Davis; Record Keeping in Public Health Work, Dr. Louis Dublin.

Professor Annie W. Goodrich spoke in Providence on January 9, at a meeting of the Federation of Women's Clubs, to a gathering of members of boards of trustees and of the medical staffs of several hospitals on "Some Problems in the Education of Nurses."

On December 18, in Cleveland, Professor Isabel M. Stewart addressed a meeting of hospital trustees and others on "Practical Problems in the Relationship of Universities to Schools of Nursing."

Josephine Durkee, '07, for many years engaged in public health nursing in New York state, and for several years past director of the division of public health nursing of the New York State Department of Health, has recently been appointed assistant editor of departmental publications. The state *Public Health Nurses' Bulletin* falls entirely to her charge.

Many valuable opportunities are available in New York City for the field work considered desirable as a part of the training of public health nurses, but there are special problems to study, and situations to meet in rural regions for which work in a crowded city district affords little preparation. The department has been for some time looking about for suitable opportunities of this nature in some adjacent country section, and for some months past its public health division has been engaged in a careful study of the possibilities which might be developed in certain counties in New Jersey for satisfactory field training in rural work. Several associations are now occupied in working out a good health program, and representatives from the Mon-

mouth County Social Service Organization, the Tuberculosis Organization, the County Red Cross, together with the county superintendent of schools, and Miss Lillian Hudson of the public health division of this department, are conferring as to the value and proper organization of the rural resources and opportunities which might be made available for groups of students of public health nursing. Miss Hudson has made a number of visits to the county to study the situation and is confident that a good and varied training field can be created. There are already fourteen public health nurses under appointment with the various organizations, and in order that their work may be more unified, the organizations are coöperating in the support of a county advisory nurse, Miss Elsie Brehaut, who was a former student of the department.

It is hoped that a complete study of the field may soon be prepared and an outline of the affiliation of the department with the county submitted.

NORMAL SCHOOL EDUCATION

The department has been asked to coöperate in the New York rural school survey and to give special attention to the various phases of the study dealing with the personnel of the teaching staff and the professional preparation of teachers. This survey will be conducted during the coming year, under a subsidy from the Commonwealth Fund. It will be in charge of a committee of twenty-one, representing the rural-life interests of the State.

At the invitation of the New Mexico Special Revenue Commission, Dr. Willam C. Bagley made a brief study in October, 1920, of the higher institutions of the state with especial reference to the possibility of consolidating the University, the State School of Mines, the College of Agriculture, and the two state normal schools. Professor G. D. Strayer and Professor E. P. Cubberley coöperated in making recommendations based on this study.

The following studies by members of the major course, and of the practicum in professional education of teachers, have been published during the past year: "Educational Adminis-

tration and Supervision," February, 1920, "The Personal Characteristics of the Teacher, W. J. Osburn; October, 1920, "A Practical Course in Teacher-Training," Hugh Stuart; "Why Do Men Turn from Teaching," J. L. Creech; "The Organization of Social Life in a Small Normal School," Bertha M. Ronan; December, 1920, "The Functions and Responsibilities of the Critic Teacher," Yetta Shoninger; "Graded Exercises in Practice Teaching in History," Emily Goodlet; "A Professionalized Course in Nature Study," Jessie J. McNall; "School and Home Education," April, 1920, "Education in Nova Scotia," A. G. Melvin, also issued as Bulletin No. 66 of the Eastern Illinois State Normal School; "Training Departments in the State Normal Schools of the United States," L. M. Wilson.

The positions of associate and assistant in the department, authorized by the Trustees last spring, have been filled by the appointment of Mr. Edgar D. Randolph and Miss Grace M. Shepherd. Mr. Randolph was a graduate student at the College in 1911–12 and served for a year as assistant to Professor Suzzallo. He is now on leave of absence from a position in the extension department of the Colorado State Teachers College. Miss Shepherd, who is well known as a former state superintendent of public instruction for Idaho, and as treasurer of the National Education Association for several years, has been a graduate student at the College since September, 1919.

At the request of the executive committee of the National Education Association, Dr. William C. Bagley has assumed the editorship of the new Journal of the Association, the first number of which was issued January 1, 1921. Dr. Bagley's chief duties in this connection will be the contribution of one or more editorials each month.

RECREATIONAL LEADERSHIP AND SCOUTING

Camping for health and recreation has taken such forward strides that it has revealed an urgent need for trained leaders. To aid in providing leadership for the movement, and primarily to increase the efficient utilization of the camper's time while in camp, the department of recreational leadership is extending the scope of the camp leadership course begun last year. The

eighty-eight members of the course last year, while in camp Easter week, worked in small groups; but at the Monday evening meetings at the College, were all assembled in one class. This year the course, which begins March 7, is divided so that for a part of each meeting the camp directors and camp councillors work in separate groups.

The special scoutmasters course given every spring in coöperation with National Council, Boy Scouts of America, and with the councils of the five boroughs of greater New York, is this year being extended so that some fifteen Boy Scout Councils in and around New York City are coöperating with the College. Last year the two hundred and forty men in the course were organized into regular Boy Scout troops and did their work as such; this year in the course beginning March 17, greater attention is being paid to the individual patrols that compose these troops. In addition, the scoutmasters this year are divided into the new and veteran groups. A coöperative attempt is being made to work out and demonstrate the pedagogy of scouting.

There has come to be so great a demand for Boy Scout camp directors, that to aid in providing leadership for Boy Scout camps and for other camps using a part of the scout plan, Teachers College, in coöperation with the camp department of the National Headquarters, Boy Scouts of America, is to give a special course, beginning April 2, for Boy Scout camp directors.

Dr. Fretwell was the speaker at the meeting of the Camp Directors Association of America, February 19. His subject was "Some Educational Possibilities for Campers."

Mr. C. F. Smith has been aiding in training the leaders of the New York City History Clubs, so that the leaders can use better recreational methods with these volunteer clubs.

RURAL EDUCATION

As usual, a rural education section has been arranged for the Alumni Conferences, on March 18 and 19, and a number of former students are expected. Professor O. G. Brim of the department of rural education, Cornell College of Agriculture, will preside at this section. The rural program, in harmony with the general purpose of the conference, will emphasize the

Teachers College Endowment Drive. Several former students and the entire rural staff will participate in the discussions, and it is hoped that some tangible results for furthering the activities of the department may be realized. On Friday evening, March 18, a special dinner will be held for the alumni and students of the departments of rural and normal school education. Dr. Clyde Furst, of the Carnegie Foundation for the Advancement of Teaching, Professor Bagley, Dean Russell, and others will speak.

A complete directory, giving the present location of all students enrolled in rural education classes, during the past three years, that is, since September, 1917, has been prepared and will be mailed to former students upon request. A revised mailing list of former rural students and others has been completed. All this is preparatory to the bi-monthly publication of a rural education news-letter which should make its first appearance soon after this issue of the RECORD.

From February 2 to 4 the annual county conferences, now held regularly in Hunterdon and Warren counties in New Jersey, as a feature of their affiliation with Teachers College, were again convened. The topics of special emphasis this year were education, child welfare, and agriculture. The chief speakers were Mr. Hugh Magill, field secretary of the National Education Association; Professor E. C. Lindeman, secretary of the American Country Life Association, Greensboro, N. C.; Mrs. Rose Huff Morgan, New York City; Dr. E. S. Evenden, and Dr. Warren H. Wilson, Teachers College; and Professor Alva Agee, secretary of the New Jersey State Board of Agriculture.

The rural department of Teachers College has been asked to coöperate in the New York Rural School Survey by directing the community relations phase of the study, and assisting in the investigation of high school training classes and rural school curricula. This survey is unique in the history of education, since it was demanded by the rural-life interests of the state, and will be under the general direction of seven leading farm organizations of the commonwealth. Professor George A. Works, of Cornell University, and an alumnus of Teachers College is directing the work.

Mr. Columbus K. Simango, a student in rural education at

Teachers College, is joint author, with Miss Natalie Curtis, of a new book, which has just come from the press, (G. Schirmer Company, New York) entitled "Songs and Tales from the Dark Continent." Mr. Simango, who is a native of Portuguese East Africa, has attracted unusual attention because of his fine personal qualities and remarkable mentality. At fourteen years of age he could neither read, write, nor speak English, but in ten years he has been graduated from Hampton Institute and spent two years in Teachers College, from which he will soon take his bachelor's degree. Eventually, Mr. Simango expects to return to Africa, where he plans to establish an African Tuskegee among his people. His counsel is constantly sought by those interested in African education.

HORACE MANN SCHOOL

All classes of the Horace Mann School have taken an active part this year in the campaign for the relief of destitute children in Europe. The Pilgrim Pageant was given partly to raise money for this cause. Thirteen hundred and thirty dollars were given to the Committee for Relief in the Near East. This contribution entitled the school to have a representative at the dinner, given by Mr. Hoover, for all organizations and individuals who had given one thousand dollars or more to the cause. Miss Hotchkiss was the representative for the school and gave a vivid account of the dinner, and the great need of the children, to an assembly of the entire school. At the same time, motion pictures were shown of the children being fed by the commitee. In response to a general demand on the part of the pupils and teachers, the month of January was devoted to a campaign for personal sacrifice by the pupils for this cause. It was agreed that the pupils of the school should contribute only sums of money which they had themselves earned or saved.

The organization of the campaign was placed in the hands of the Girls' League in the high school, and the Civic League in the elementary school, the regular organizations through which the school carries out activities of this nature. At the end of each week reports were given in the regular assembly of the school by the chapter leaders of the Girls' League for each class in the

high school, and by the president of the Civic League. Many cases of sacrifice on the part of the pupils were reported, such as giving up candy, sodas, motion pictures, Christmas presents of money, desserts, refreshments and decorations for class parties, dancing pumps, a ring, a new fur, a new coat, and a new gown. Money was earned by rising early and walking to school to save car fare, by tutoring, and by giving dancing lessons.

The total amount raised in the month of January was fifteen hundred dollars. The utilization of this campaign to educate the children in the larger world needs, and in the organization of such an effort, illustrates a phase of the work constantly going on in the school which does not appear in the printed curriculum.

SECONDARY EDUCATION

Professor Thomas H. Briggs is directing the study of the five high schools and eleven junior high schools in Baltimore in the general school survey of that city. At the first of the public luncheons, held on December 10, in Baltimore, Dr. Briggs presented a tentative report of findings and recommendations. Professor Romiett Stevens has made a study of the extra-curricular activities of the girls' high schools, and Professor Elbert K. Fretwell covered the same field for the remaining secondary schools. Professor M. R. Trabue, assisted by two graduate students, Mr. Elmer Garinger and Mr. Galen Jones, gave the Army Alpha Tests to the eighth grade, and to the high school freshmen and seniors, in an attempt to measure the qualitative elimination of pupils. Field work has also been done by the following graduate students: Philip W. L. Cox; William A. Landis; Sterling A. Brinkley; Raleigh Schorling; A. D. Whitman; Homer L. Garrett; Moises Saenz; Clyde P. Finger; W. A. Linton; Mercy Hayes; and Marie B. Ronan.

Professor Briggs is acting as advisor for the study of secondary schools in the survey of the educational system in Philadelphia, which is being conducted by the Pennsylvania State Department of Public Instruction. Professors F. W. Johnson and Elbert K. Fretwell are aiding in special phases of the work. The former has made a study of the principals and their work, while the latter has been concerned with the extra-curricular activities.

The secondary education group of high school principals in New York and vicinity has held three interesting meetings during the present school year. At the first meeting, Mr. W. M. Aikin, of the Scarborough School, reported on his mission to Great Britain last summer, and led a discussion concerning the responsibility of secondary schools in bettering international relations, and in promoting international amity. The general topic at the December meeting was "The Social Sciences in the Secondary Schools." Mr. Daniel C. Knowlton, of the Lincoln School, told of the plan of the national committees on social agencies, and Mr. Roy W. Hatch, of the Horace Mann School for Girls, and Mr. J. M. Gathany, of the Scarborough School, reported some features of progressive teaching in their classes. A vigorous discussion followed. Professor Henry Johnson embodied this discussion in a constructive program on history teaching in the high schools, which he presented at the February meeting.

During examination week, in January, Professor Briggs was called to New Orleans for a series of conferences with Superintendent Gwinn, and the Board of Education, concerning the establishment of junior high schools in that city.

Professor Johnson gave two addresses at the secondary school section meetings of the State Teachers Association of Maine.

Professor Fretwell and Mr. Charles C. Tillinghast, principal of the Horace Mann School for Boys, were speakers at the Monongahela Valley Teachers Association, Fairmont, W. Va., February 4 and 5. Professor Fretwell was also a speaker for the New York City History Clubs, February 9, the Camp Directors Association of America, February 19, and for the public school teachers of Hazleton, Pa., March 4.

THE SECONDARY CLUB

The Secondary Club this year held several monthly meetings devoted to the study of present day education in foreign lands. The first meeting, held on October 28, included addresses by Dean James E. Russell on "Education of the Future," and by Dr. Thomas H. Briggs on "Needs of Secondary Education Today." The following officers were elected for the coming year: President, Mr. Clyde P. Finger; vice-president, Miss Ethel Rollinson;

secretary, Miss Mildred White; and treasurer, Mr. Homer Garrett. The executive council is composed of the officers together with Mr. S. C. Farrior, Mr. C. Brinkley, Mr. A. D. Whitman, Miss Alice Dearborn and Miss Mercy Hayes.

The second meeting of the club was held on November 23. The program included addresses by Chinese members of the club on "Education in China," "Private Schools," "Government Schools," and "Mission Schools." A social hour followed.

The club held a Christmas party on December 16. Dr. Briggs told a Christmas story, and all joined in singing carols and playing games. At the February meeting of the club, on February 3, Dr. Kilpatrick delivered an address on "Education in England," based upon his recent extended visit to the secondary schools in England.

EUROPEAN STUDENTS' RELIEF FUND

The drive for the aid of destitute students in Central Europe, conducted by the American Relief Administration, has been enthusiastically supported by Teachers College. Following an address by Dean Frederick Keppel, on the situation abroad, a bureau was opened for receiving subscriptions. Within a few days, a total of eight thousand dollars was subscribed by Teachers College. It is a matter for congratulation that Teachers College stands second among the American colleges in the list of contributors. The only institution exceeding this figure was the University of Illinois. Lawrenceville Academy comes third on the list. In addition to this fund, Whittier Hall, on Self-Denial Day, raised, by personal contributions, one hundred eighty dollars. These gifts included contributions not only from the students and staff but also the employees.

THE NEWMAN CLUB

The monthly meetings of the Newman Club, for the discussion of all phases of social work, have been well attended. Among the speakers who have addressed recent meetings of the club are Miss Olive Smith, assistant director of the Near East Relief in Constantinople, and Father Riley, chaplain of the New York

Province of the Federation of College Catholic Clubs. Among those who will be heard at other meetings are Mr. Bernard J. Fagan, chief probation officer of the Children's Court, and Mrs. Carlton J. H. Hayes, formerly with the Girl Scout Movement.

A course of lectures on the Bible has been given by Father Riley, twice weekly, which have been well attended.

The Federation of College Catholic Clubs will hold its annual conference at Cliff Haven the last week in June. A large delegation from Teachers College will be present.

THE LINCOLN SCHOOL

The site on 102nd Street and Fifth Ave. which was previously chosen for the new building of The Lincoln School involved certain difficulties which those who are responsible for the school greatly desired to avoid. Therefore, for some months, constant effort has been made to locate and secure a site which would be more quiet, provide proper light on all sides, freedom from too close proximity to other schools and other institutions, a larger amount of open-air playing space, and added space for the building itself. Such a site has been secured on 123rd Street between Amsterdam and Morningside Avenues. The plot faces Morningside Park on the South. It is 425 feet long, thus being 11,500 square feet larger than the site previously chosen.

The building will occupy the central portion of the area, thus leaving a playground at each end. The building will be longer than the one previously planned, and will have open space at the back, thus insuring air and light from all sides. The form and size of building as planned also provide space for an open-air roof playground which has an area of 5,300 square feet, which with two adjacent gymnasiums make it possible for all pupils in the school to play with protection from inclement weather, but in open air when they cannot go to the outdoor playgounds.

The new site may be reached by Fifth Avenue bus lines which run on St. Nicholas Avenue within one block of the proposed school building; also by the west side subway and by the Amsterdam Ave. and Broadway surface cars. If necessary, bus lines will also be operated for the use of Lincoln School pupils. In the early morning at the time when pupils wish to go to school, the ordinary

transportation facilities carry light loads to the northward thus leaving abundant space for the children who go uptown; and in the afternoon the heavy business traffic is northward, thus leaving less crowded facilities to pupils who are returning southward.

All who have considered the possibilities of the building of the Lincoln School and the new site are pleased with the change and believe that it will offer a very much improved opportunity for the development of the school. The new building plans are well advanced and it is expected that constructive work may soon be under way. The school will operate in its present location for another year following this one.

ALUMNI ACTIVITIES

DR. EARHART ELECTED ALUMNI TRUSTEE

At the meeting of the Trustees of Teachers College, held on February 11, Dr. Lida B. Earhart, professor of elementary education at the University of Nebraska, was elected alumni trustee for a period of two years, beginning March 1. Dr. Earhart succeeds Dr. Agnes L. Rogers, professor of education, Goucher College, Baltimore.

Dr. Earhart received the degree of Bachelor of Science from the University of Michigan in 1901. She received the master's degree at Teachers College, Columbia University, in 1906, and the doctor's degree in 1908. Dr. Earhart has enjoyed a varied experience in teaching. She served as instructor in elementary education in Teachers College, 1908–1909; as instructor in psychology in the State Normal School, Providence, R. I., 1910–1911; as principal of public schools in New York City from 1915 to 1918; and has been professor of elementary education in the University of Nebraska since 1919.

MR. McMULLEN APPOINTED PRESIDENT OF THE NORMAL SCHOOL IN FLAGSTAFF

Mr. Lynn B. McMullen has been appointed president of the State Normal School at Flagstaff, Ariz. Mr. McMullen graduated from De Pauw University in 1897 with the Bachelor of Science degree. He taught in the Shortridge High School in Indianapolis, and later became vice-president of the State Normal School at Valley City, N. D. He received the degree of Master of Arts from Teachers College in 1919. During the past year, Mr. McMullen served as superintendent of the training school of the State Teachers College at Greeley, Colorado.

MR. COOK APPOINTED STATE SUPERINTENDENT OF SCHOOLS IN MARYLAND

Mr. Albert S. Cook has been appointed superintendent of public instruction for the state of Maryland. He has been for

a number of years superintendent of the schools of Baltimore County, Maryland, and previously served as principal of the Franklin High School, Baltimore County.

Mr. Cook graduated from Princeton University in 1895 with the Bachelor of Arts degree and in 1906 received the Master's degree. He has spent a year in graduate study at Teachers College.

DR. BROOME ELECTED SUPERINTENDENT IN PHILADELPHIA

Teachers College alumni will be pleased to learn of the appointment of Dr. Edwin C. Broome, ex-president of the Alumni Association, as superintendent of schools in Philadelphia. Dr. Broome received his Doctor of Philosophy degree from Teachers College in 1902 with a diploma in school administration. Previous to his attendance at Teachers College, Dr. Broome was supervising principal at Seymour, Conn. His academic training was received at Brown University where he took the Bachelor of Philosophy degree in 1897, and the Master of Arts degree in 1898.

After his studies at Teachers College, Dr. Broome became superintendent of schools in Rahway, N. J., and later occupied the same position at Mt. Vernon, N. Y. Since 1913 Dr. Broome has served as superintendent of schools at East Orange, N. J. During a leave of absence from East Orange, in 1918, Dr. Broome was general supervisor of field work for the Army Educational Commission of the American Expeditionary Forces in France, Luxembourg, and Germany.

ALUMNI ASSOCIATION OFFICERS

At a meeting of the Alumni Council of the Teachers College Alumni Association, held March 19, the election of the following officers of the Association was announced: President, Miss Lida Lee Tall, principal of the State Normal School, Towson, Md.; second vice-president, Mr. Willard P. Tomlinson, head-master, Swarthmore Preparatory School; corresponding secretary, Miss Edith E. Swan, of the Bureau of Educational Service, Teachers College. The officers have been elected for a term of two years, beginning March 1, 1921.

PHILADELPHIA TEACHERS COLLEGE CLUB

Over 60 members of the Teachers College club of Philadelphia met on the evening of December fourth at Drexel Institute. Dr. Thomas H. Briggs of the secondary education department of Teachers College was present, and made a most interesting address. The meeting was the third held by the Club this year.

ALUMNI CONFERENCES

The annual Alumni Conferences will be held this year on Friday and Saturday, March 18 and 19. The program will be varied and will present several features distinguishing it from those of other years. The Practical Arts classes, which have previously held their reunions at various times during the year, have been invited to make their meetings this year a part of the general Alumni Conference. The executive committee wishes to make these reunions representative of the College as a whole rather than of any particular school or department. Many of the classes have signified their approval of this plan.

It is especially planned this year that the General Alumni Conference on Saturday morning shall be the chief feature of the entire series of meetings. This meeting, therefore, will be held in the Horace Mann Auditorium, and all Teachers College alumni are urged to be present. Dean Russell, Professors Hillegas, Rogers and Miss Tall will speak at this conference.

Among the important departmental conferences which have been arranged is one on "The Dangers and Difficulties of the Project Method," to be held on Saturday afternoon in the Horace Mann Auditorium. Professors Bagley, Bonser, and Kilpatrick will take part in the discussion.

The household arts program this year includes a coöperative research group for housewives under the direction of Professor Andrews. The conference on nutrition in which the nursing and health group will join on Friday afternoon and evening, will be especially helpful to those interested in these fields. Many sectional luncheons and dinners have been provided in this year's program.

TEACHERS COLLEGE FESTIVAL

The try-out for the Teachers College Festival was held on February 10, 11, and 12. The parts were assigned, and rehearsals were at once started. A great variety of characters will be presented including dancing beggars, troubadors, tumblers, food vendors, balloon merchants, and a performing bear. The play is in three acts. After an opening chorus, the master beggar announces the title of the play, "The King's Wreath." In the first act, the master beggar makes his plans, and the king and his court set out for the great forest. The next act includes the merry council of the beggars in the forest. The play concludes with the king's return home and the festival. The master beggar announces the moral of the play, and, at the king's command, the remainder of the evening is spent in dancing and merry-making. The performances of the Festival will be held on the evenings of March 17 and 19.

BUREAU OF EDUCATIONAL SERVICE

Some misunderstanding seems to have developed among certain groups of alumni of Teachers College regarding the appointment service rendered by the Bureau of Educational Service. It has been discovered that some of our alumni feel that they have no claim on this service and that it exists only for students at the College. This is entirely wrong. The purpose of the Bureau is to serve the cause of education rather than any particular group of students or graduates. Any one who has attended Teachers College may register and be considered for such vacancies as are reported to the Bureau. It is true, of course, that when an employer comes to the College for help, he sometimes prefers to choose a candidate who is available for interviews rather than one who is somewhere in the field; but recommendations are made wholly on the basis of fitness, as indicated by credentials on file, rather than on the basis of any feeling that the College is responsible for placing its present students in preference to its alumni.

School officials throughout the country are asked to note that recommendations are not made, even where it is known that a position is vacant, except upon direct request from the officials

themselves. They are also asked to realize that the credentials on file in the Bureau of Educational Service are not general recommendations, but are letters written directly to this Bureau. These papers are not available for candidates to see or to send out themselves.

Teachers College alumni who are now in positions of responsibility, where they are required to select supervisors, principals, and teachers are invited to make their needs known to the Bureau of Educational Service. In doing so it is requested that the application contain specific information regarding the type of work to be done, and the salary connected with it. A great deal of correspondence is sometimes required in order to clear up some of these items before intelligent nominations can be made. The Bureau would like to make it unnecessary for Teachers College alumni ever to be dependent upon a commercial teachers' agency.

Information regarding educational practice and theory will be gladly furnished to alumni or to any other persons interested in educational work so far as the limits of the office staff will permit. The Bureau is especially anxious to have reports from alumni in the field regarding educational experiments and measurements. Those wishing to coöperate in such service are invited to write whenever they so desire.

RECENT APPOINTMENTS

ADAMS, ANNE, head of home economics department, Hood College, Frederick, Md.

ANDREWS, RUTH, head of physical education department, North Dakota Agricultural College, Fargo, N. D.

BACHE, ELIZABETH D., head of home economics department, Rhode Island State College, Kingston, R. I.

BACHE, HARRIET, instructor in domestic art, Pennsylvania State College, State College, Penna.

BAKER, RUTH S., instructor in French, Abbott Academy, Andover, Mass.

BEAM, MILDRED E., instructor in physical education, Child Education Foundation, New York City.

BEAR, JENNIE R., state supervisor of vocational homemaking, Dover, Del.

BILHUBER, GERTRUDE, instructor in physical education, Scudder School, New York City.

BISHOP, HELEN C., social director of Betsy Barbour House, University of Michigan, Ann Arbor, Mich.

BOCKER, Dr. DOROTHY, director of child welfare, State Board of Health, Atlanta, Ga.

BOWMAN, CLYDE, director of industrial arts, State Normal School, Menomonie, Wis.

BRADT, GERTRUDE E., dean of women, State Normal School, Mansfield, Pa.

BRANDENBURG, LOLA E., professor of home economics, State Teachers College, Kirksville, Mo.

BRANEGAN, GLADYS, assistant state leader of home demonstration agents, Bozeman, Montana.

BRIDGE, SARAH HELEN, head of home economics department, University of Nebraska, Lincoln, Neb.

BRIGHAM, RUTH, instructor in physical education, Friends School, Baltimore, Md.

BROWN, ELIZABETH, assistant manager of Colonnade Lunch Company, Cleveland, Ohio.

CAMPBELL, ROBERT, assistant supervisor of industrial arts, New Jersey.

CAMPIGLIA, SYLVIA, state supervisor of home economics, Reno, Nev.

CARLSON, GUDRUN, professor of home economics, Rutgers College, New Brunswick, N. J.

CARRISON, ELIZABETH, instructor in physical education, DePauw University, Greencastle, Ind.

CASTLE, MARY G., supervisor of art, public schools, Virginia, Minn.

CENTER, AUGUSTA, professor of English, Bessie Tift College, Forsythe, Ga.

CHENEY, LAURA J., instructor in household administration, Purdue University, Lafayette, Ind.

CHRISTAL, ROSE V., instructor in physical education, Country Day School, Scranton, Pa.

CLOW, THERESA A., supervising dietitian of state institutions, Illinois.

COLBURN, ELIZABETH, instructor in fine arts, University of Vermont, Burlington.

COLEMAN, MARY C., assistant professor of hygiene, State Normal School, Greensboro, N. C.

CONE, CLARA L., head of home economics department, Girls High School, Atlanta, Ga.

DAVIS, CAROL M., head of home economics department, State Normal School, Fredericksburg, Va.

DAVISON, Mrs. EDITH, assistant professor of vocational teacher training, Pennsylvania State College, State College, Pa.

DEVINNEY, LAURA, instructor in fine arts, public schools, Cleveland, O.

EDWARDS, MARGARET M., associate professor of home economics, Kansas Agricultural College, Manhattan, Kan.

FISHER, MARY R., supervisor of home economics, public schools, Twin Falls, Idaho.

FLEGAL, MARY E., supervisor of fine arts, public schools, Durham, N. C.

FLINT, CLARISA, instructor in English in high school, Atlantic City, N. J.

FRYMIR, ALICE, department of physical education, State Normal School, Mankato, Minn.

FULTON, FRASER, instructor in fine arts, Skidmore School of Arts, Saratoga Springs, N. Y.

GOWANS, ETHEL, head of biology department, State Normal School, Kent, O.

GREEN, MARY WATSON, dean of women, Rockford College, Rockford, Ill.

HADLEY, GERALDINE, dean of home economics department, Bradley Polytechnic Institute, Peoria, Ill.

HAMILTON, MARION, head of home economics department, Sullins College, Bristol, Va.

HANNA, CLARENCE, instructor in English, public schools, Cleveland, O.

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